INSTITVTIONIS

ASTRONOMICÆ

TOMVS SECVNDVS,

DE

Fabrica Planisphærii,

ET

Trigonometria Astronomica

in partes tres distincta;

I. De Generibus & affectionibus Triangulorum tam planorum quam Sphæricorum.

II. De Resolutione Triangul. Sphær. per planisphærium.

III. De Resolutione Triangulorum Sphæricorum, tum etiam planorum per Triang. canones.

Adjecta quoque hisce

Mechanica Planorum Triang. solutio beneficio circini & regulæ.

FRANEKERÆ,
Apud AEGIDIVM RADAEVM
Ordinum FRISIAE Typograph.

CIↃ. IↃ. CVI.

Nobilissimis atque Amplissimis Illustris Academiæ 266

FRANEKERANÆ

CVRATORIBUS,

D. KEMPONI à DONIA,
Territorii Leoverdiensis Grietmanno,

D. IELGERO à FEYTSZMA,
Supremæ Curiæ Senatori, Custodi Fisci, ac Agri Biltensis Grietmanno,

D. EILARDO REINALDA,
Grietmanno in Donievverstal.

D. GELLIO HILLEMA,
in suprema patriæ Curia Senatori.

SI quæ contemplatio rerũ hujus mundi digna homine ratione prædito; est hæc profecto, quę cęlestia perscrutatur. Cælum hoc inquã aspecta-

bile, atq; micantia in eo Sydera, tanto artificio atque ordine ſummi Architecti diſpoſita, ut meritiſsimè exclamet Divinus ac Regius vates, CAELI ENARRANT GLORIAM DEI. Sed quibus? an non iis, quos formâ corporis non pronâ (uti cætera animantia,) ſed erectâ donavit, ut nimirum ex jugi aſpectu pulcherrimæ iſtius fabricæ ſapientiam ſuam, bonitatemque immenſam admirarentur, ac depredicarent? Itaque legimus primos hominum cœlorum atque aſtrorum motus non obſervaſſe ſolum, atque optime calluiſſe, verum etiam poſteris ſtudioſe tradidiſſe, quod præviderent, nobiliſsimam hanc ſcientiam ad plurima ipſis fore neceſſariam ac conducibilem. Nam quis ſine ea tempora diſcriminaſſet? quis terras colere? quis maria ſulcare noviſſet?

Sed

Sed laudes ejus ac multiplicem usum 267
hic referre non est mihi institutum,
quod alii id abunde ante me præstite-
re. Quin potius, vobis viri Nobilissimi
atque Amplissimi, quid in hoc secun-
do operis mei Tomo præstiti paucis
cõmendare. Itaq; isto Planisphærii fa-
bricam, ac per eam amplissimam, at-
que abstrusam Triangulorum Circu-
larium doctrinam novo modo exhi-
beo. Deinde eandem per Canones
(quod & ab aliis, sed aut fuse nimis
aut obscure factum) compendiosa ac
nova via edoceo. Doctrinam sane ad-
mirandam, & in quâ, ut loquitur Di-
vinus Plato, alæ delitescunt, quarum
remigio mens humana in cælos sub-
lata ita exacte corporum cælestium
mensuram, numerum, motuumque
leges ediscit, ut deorsum relabens ma-
ris terreque spatia apte perfecteque

deſcribat. quod e ſequentibus tomis Lectori patebit. Et eſt quidem docēdi ratio, quæ fit per inſtrumenta, ad introducendos tyrones haud incommoda, imo & neceſſaria; ſed ſi cum hac comparetur, tam diverſa, atque eſt domuncularum, quas pueri colludentes e luto aut argilla extruunt, ad vera aut regalia ędificia. Hanc ego doctrinam tam arduis, tamque ſingularibus præceptis ornatam, vobis viris in arduo ac ſingulari loco poſitis (ut qui præter alias dignitates non ſolum curatores eſtis hujus Academiæ vigilantiſsimi, ſed et primitus fundatores prudentiſsimi) dedicare haud vereor: Sperans neque ſcriptum mihi fore dedecori, neque inſcriptum vobis dedignationi. Quod ſupereſt, (quo eſtis in Academiam, ac ſtudia noſtra communia favore) me meaque vobis commendo.

mendo. Valete viri Nobilissimi atq; 268
Amplissimi, festinanter Franequeræ
19. Kal. Febr. CIↃ.IↃ.CVI.

Vestræ Nobiliss. Ampl. addictiss.
A. METIUS.

IN
Clarissimi viri
HADRIANI METII,
Trigonometriam.

CVM tua te genitrix vitâi ferret in auras,
Dictaret que tibi prospera fata parens,
Adstiterant Musæ, plorantemque una Sororum
Excipit, & dulci collinit ora favo;
Quærentique foret puero quod amabile nomen
Uraniæ, nomen, METIUS, inquit, erit.
Ille olim rapidos cœli Septemplicis orbes,
Fixaque syderio signa minora polo
Metiri, occasum atque ortum signare docebit
Astrorum, & quidquid lucidus orbis habet.
Ille vagos scribet phœbi, lunæque labores,
Et quo pigra modo plaustra Boatis eant
Ille meis primus Frisiis cœlestia tradet,
Ille Syracusium vincet & arte senem.

Stan:

Stant rata vota tua, Meti clarissime, Divæ;
Illa jubet, jussus tu facis esse ratos:
Tu nos alta doces magni Miracula mundi,
Fataque quæ nobis flammea signa notant;
Quadrisidum variis habitatum gentibus orbem,
Quoque jacent mundi climate regna doces.
Et ne tam angusta lateant dictata lyceio,
Das populo quidquid pulpita docta sonant.
Dii tibi pro tantis meritis, clarissime Meti;
Nestoreos faciant posse videre dies,
Notaque tam sero repetas fœliciter astra,
Quam tibi pro meritis, docta Iuventa favet.

SIBRANDVS SICCAMA, I. V. Doctor & Reip. Bolsvvardianæ Secretarius.

EX POEMATIBVS

FOPPII AB AETSMA,

I. V. Doctoris,

Carmen inscriptum autori.

QVÆ tibi de domibus superis cęloq; parantur;
Quos habeãt motus, quas vaga signa vices,
Quid premis, o Meti, instantis tibi prodige laudis?
Ire foras pridem debuit iste liber.
Sidera te norunt, Cælum tibi servit ad unguem:
Quæ tibi virtutum præmia terra neget?

Superiori Tomo cognitionem & usum primi mobilis, quā potuimus pauciſsimis, per ſphærā ſolidam ad imaginem cæli conſtructam exhibuimus. At licet ſphęræ inſtrumentū omnibus modis ſit abſolutum ſua tamen habet incommoda, adeo ut neq; omnibus æque poſsit eſſe uſui. Quare propter cauſas non inutiles veteres ſtuduerūt & conati ſunt, ſphęræ circulos (per quos motuum cæleſtium cognitionem & uſum percipimus) in planam ſuperficiem traducere, idque *analemma* vocat Vitruvius, vulgo *aſtrolabium* ſeu *planiſpherium* dicitur. Inſtrumentum ſane ſummæ admirationis, quod diſciplinę mathematicæ pręſtantiam tanto magis extollit, quanto pluribus modis ejuſmodi deſcriptionem fieri traditum eſt. Nam ſunt qui centrum oculi, a quo radii viſorii in ſubjectum emittuntur, in centro mundi: alii autē in æquatore: alii in alterutro polorum, alii deniq; alibi conſtitutum imaginantes, pro diverſitate ſitus diversā quoque ſphæræ faciem in planū traducere docuerūt. Vnde non modo univerſalia, ſed &

particularia planisphęria ad certā determi-
natāq; poli elevationē elaborata ꝓdierūt.

Ex quibus omnium commodissimū & maxime universale existimam⁹ illud, quod ab illustri Mathematico Gemma Frisio Astrolabium catholicum appellatum fuit.

Inventum quidem vetus est, qua ὑπογραφὴν: sed usum ejus multiplicem & uberrimū oīum primus exhibuit prædictus Gemma frisius in libello suo sphærico de Astrolabio Catholico, tam elegāter, quam erudite conscripto; cujus quidē præcepta pro ingenii modulo ad certā methodū revocare, amplissimā insuper illā, & reconditā triāgulorū sphæricorū doctrinā per idē hoc planisphæriū exhibere, omniaq; instrumenti penetralia recludere, ejusq; secreta pādere, studiosāq; juventutē ad Ptolomaicā, Copernicēā, Tychonicāq; Matheſin, & ad verā, genuinā, omnibusq; numeris absolutam Astronomiam deducere studuimus.

Etsi .n. de utilitate operis laborisq; mei, alios, non me, verba facere oporteat: huius tamen plus se hinc cepisse fatebitur nostri studiosus, quā ego verbis verecunde spondere ausim.

EST igitur planisphærium instrumentum, sphæram ipsam in planum traductam exhibens, per quod longè cōmodius ac per globum motuū cælestium usum adipisci liceat. *Describitur & constituitur instrumentum hoc in tabula plana, sive lignea sive æneā, bene et diligenter complanata, ac per circinum in orbem redacta, quæ vulgo* corpus planisphærii *dicitur.* 270

Corporis duæ sunt partes, Anterior & Posterior.

1 Descriptio Anterioris partis sive faciei planisphærii.

Anterior corporis planisphærii pars dicitur facies, estque tabula generalis continens dimidiatam sphæram circulis suis depictam, integram tamen sphæram referens.

Circulorum faciei inscriptorum duæ sunt species: aut enim rectis constat lineis, aut periphæriis.

Quæ rectis constant lineis, sunt ecliptica, & diametri duæ, quarum una meridianus rectus dicitur; altera parallelus rectus.

Quæ peripheriis describuntur, illæ aut in polos ambos (mundi polos ut plurimum referentes) concurrunt, aut eos ambiunt.

Quæ in polos concurrunt, meridiani vel horarij dicuntur, quod eorum vice magna ex parte fungantur.

Quæ vero polos ambiunt paralleli vocantur: nam etsi in plano paralleli prorsus non appareant, tales tamen in cælo intelligendi.

[Verum utrique hi circuli, pro rei necessitate & diverso in operationis usu, varia sortiuntur nomina. Namque eosdem illos mundi polos pro Zodiaci polis assumere licet, atque tunc qui circuli meridiani dicti sunt, erunt circuli longitudinum, paralleli vero jam erunt latitudinum.

Rursus si eosdem polos statuas horizontis hoc est punctum verticis, punctumque pedum, quæ Arabes Zenith & Nadir appellant: tunc meridiani erunt circuli verticales, paralleli vero circuli altitudinum. Ex hac permutatione provenit hujus organi copia & usus varietas.]

Et hisce tandem omnibus circumscribitur Limbus in 360 divisus.

Et hæc faciei astrolabii insunt, cui adhibenda regula diametro faciei secundum longitudinem æqualis, quæ horizontalis dicitur. Nam ejus partem ut plurimũ tuetur, in cujus superficie totus Zodiacus cum duodecim suis signis

signis & gradibus inscribitur: defert praterea hæc regula brachiolum, quod erit tribus membris flexibile: ita ut ad omnes faciei circulos extendi & contrahi possit. Hæc regula per clavum teretem ita centro astrolabii aptanda erit, ut libere in centro circumvolvi possit.

Hactenus de partium faciei enarratione. Sequitur earundem inscriptio.

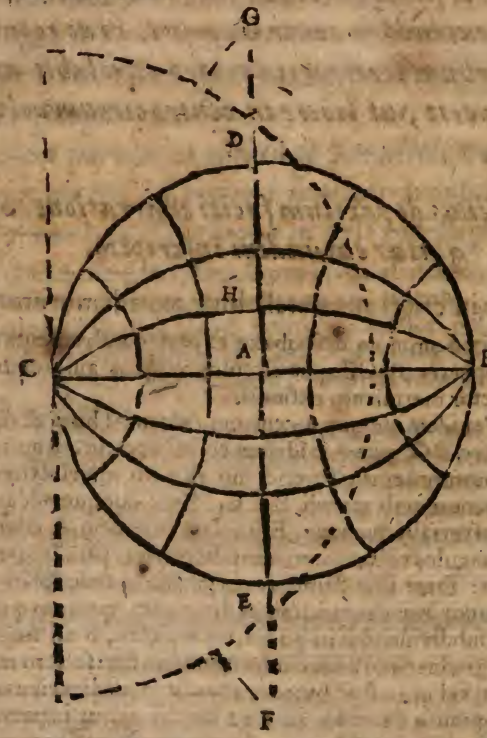
2. De inscriptione parallelorũ meridianorumq;.

[Primo omnium describatur ex centro instrumenti. A. peripheria BDCE. quæ circulos reliquos amplexura, dicetur meridianus extimus.

Per idem quoque A centrum descendat linea & diameter. B C, quæ meridianus rectus vocetur, in quo ad communes ejus cũ meridiano extimo intersectiones notentur poli mundi, B & C. Huic quoque addatur transversalis diameter, E D, ipsam in eodem, A, centro ad angulos rectos intersecans, diceturque parallelus rectus: Duæ istæ diametri peripheriam descriptam in quatuor æquales quadrantes dirimunt: quorum quilibet subdividendus in 90 partes æquales, si ad singulos gradus circuli sunt inscribendi, ut fieri solet in magnis: vel in 45. si ad binos gradus, ut in mediocribus instrumentis fit: vel in 30 si ad ternos gr. ut in parvis: vel denique in 18 sive in 9. si per quinos, aut denos gradus circuli forent ducendi, ut in minimis organis fieri solet.

Peripheria pro magnitudine instrumenti sic divisa: applicabis filum tenuissimum, vel regulam una sua parte ad polum alterutrũ. nempe B, alterã partem promovebis ordine servato in singulas DCE semiperiphe-

riæ partitiones, notando interim diligenter singulas regulæ vel fili ad parallelum rectum DE intersectiones, notulasque ibidem impingendo, per illas enim ducendi sunt meridiani.



Haud dissimiliter promovebis regulam vel filum ex puncto D per singulas CER semicirculi divisiones, totidemque in meridiano recto BC intersectionum notulas signando, per quas transibunt paralleli.

His ita absolutis circumlineabis meridianos in utrũque, B, & C, polum concurrentes, & per singulas paralleli recti distinctionum notas transeuntes: quorum delineam-

lineandorum centra erunt investiganda in linea D E, ab utraque parte quam longissime prolongata. Centrorum autem inveniendorum hæc est ratio commodissima, ex polo C, ad quodvis intervallum, describatur semicirculus obscurus & delebilis, quem linea C B in duos quadrantes æquales dirimet, quorum quilibet in 90 partes æquales subdividendus, si gradatim circulos inscribere velis. vel in 45, si per binos gr. vel in 30 si ad ternos &c. ut supra. Filo postmodum & tenuissimo & longissimo ex polo, C, & per singulas semicirculi partitiones demisso, secabit idem lineam, D E, in centra meridianorum desiderata. quorum dimidia pars continetur intra peripheriam, inciduntque in ipsas distinctionum notulas ipsius, D E, paralleli recti, alternatim una notula semper intermissa: sed reliqua centrorum dimidia pars cadit extra peripheriam in partibus lineæ D E prolongatis. unde semicirculi quadrantem, inter lineas C D, & C E interceptum, intactum relinquere & præterire licebit.

Centris meridianorum ita repertis describes ex eis omnes & singulos meridianos, ita ut ad amussim per distinctiones ipsius D E paralleli recti tranieuntes, coeant in utrumque B & C, polum. Quod si forte contingat in centris longius excurrentibus operationem non ad amussim succedere, quia forte in centri annotatione aberratum fuerit: emendabitur iste error figendo circini pedem pauxillum eis vel ultra centrum repertum, & circinium diducendo aut contrahendo quantum res ipsa postulabit.

Nam plerique artifices longo usu edocti, nullis istiusmodi intersectionibus præviis, quælibet centra meridianorum parallelorum ve, quantum vis remota, in diametro statim inveniunt.

Ad parallelorum delineationem quod attinet, circumscribes eos per singulas sectionum notulas ipsius, B C, meridiani recti, ut in respondentes meridiani extimi partitiones coincidant: quorum delineandorum centra non decedunt a recta B C utrimque prolongata.

Centra illa ex meridianorum semidiametris facillime investigantur. Si enim semidiametri, secundū quas singuli meridiani descripti sunt, mensurentur a centro A, in linea B C, utrimque prolongata, constitues in partibus ejusdem lineæ prolongatis centra desiderata, quibus paralleli convenienter delineari possent.

Artifices primo decimum quemque parallelum & meridianum constituunt, quos distinctionis causa crassiore lineatura notant, quibus deinde reliquos tenui lineatura subnectunt. Rursus, duo meridiani quemadmodum & duo oppositi paralleli eadem expansione circini delineantur. Tandem ut semidiametri meridianorum in prolongata linea B C, ab instrumenti centro mensurata, centra parallelorum ibidem indicant: ita vicissim semidiametri parallelorum, ab eodem centri instrumento numerati, in D E linea utrimque prolongata, centra meridianorum monstrabunt.

At quoniam in majoribus planisphæriis circuli isti, qui diametris rectis viciniores sunt, propter longissimam suorum centrorum remotionem difficulter inscribuntur, circuli enim hi parum a rectitudine deflectunt, unde huic difficultati hoc modo occurri poterit. Fingamus utrimque desiderari quinque meridianos totidemque parallelos, ex iis qui per puncta centro viciniora duci debent. Primum, si de meridianis sit quæstio, partionem paralleli recti E D, nondum parallelis interfectam, in 5 partes æquales utrimq; partire: deinde fac similiter in arcu paralleli viciniore hoc est decimo: post in decimo quinto, & sic deinceps in singulis quinariis ad polos usque progrediendo, quibus ita peractis; si calamo scalpelloque sigillatim hæc puncta per lineam conjungas, quinque desideratos meridianos utrimque, citra errorem perceptibilem, constaveris.

Non aliter ages in compositione parallelorum, nisi quod hic vicissim eodem modo ipsos meridianos dividere, & singula divisionis puncta ad limbum usq; connectere oporteat.

Atque hæc de meridianorum parallelorumq; inscriptionibus,

ptionibus. Ad partitiones ecliptícæ & horizontis quod attinet, eæ sunt eædem cum eis quas diameter uterque habet, unde ex iisdem desumi possunt. De limbi structura a nobis dictum fuit in libello sphærico cap. 1. l. 3. De numerorum inscriptione & ordine nihil hic attinet dicere, quum talia ad oculum cernantur.]

3 Alia & nova ratione circulos meridianos & parallelos inscribere.

SEquitur nova & exquisitissima ratio inscribendi meridianos & parallelos per tabulam numerorum quam in hunc finem supputavimus, ubi sciendum tabulam hanc factam esse pro meridiani extimi semidiametro in 100000 *diviso. Monstratq; quot partes istiusmodi æquales singulis meridianis, parallelisque planisphærio inscribendis respondeant.*

[Fingatur enim super plano quodam linea recta A B æqualis semidiametro peripheriæ sive extimi meridiani: quam primo in 10 æquales partes partes: & earum rursus quamlibet in 10, quarum quævis æstimanda valere 1000 partes, continebitque isto modo linea A B partes 100000 ex quibus per circinum tot desume partes quot tabulæ area prima pro singulis diametrorum distinctionibus jubet, ac circino pro distantia earundem sic expanso, ponatur unus ejus pes in centro instrumenti A, cum altero in utraque diametro utrimque notulas impinge, per illas enim tum meridiani tum paralleli ducendi erunt, quorum describendorū centra & semidiametri ad eundem modum ex tabulæ secunda & tertia area numerari mensurariq; possunt.]

Verbi gratia in schemate priori sit describendus meridianus C H B qui exsistit Trigesimus a centro A numeratus. Hic meridianus delineandus per partem diametri, A, idque ex centro F (in diametro prolongata reperto,) secundum magnitudinem radii sive semidiametri FH. In tabula subjecta quantitas partitionis diametri AH, reperitur parti 26794. distantia centri, F, à centro instrumenti, A, exsistit 173205 part. nec non & semidiameter sive radius FH datur partiũ 200000; & hæc in partibus qualium instrumenti semidiameter A B 100000 continet. Porro eadem semidiametro ex centro G describes trigesimum oppositum meridianũ: nec non eadem semidiameter mensuretur a centro A in altera diametro C B prolongata, & invenies ibidem centrum ex quo 30 parallelus delineandus.]

Tabula continens partitiones semidiametrorum planisphærii Catholici, nec non & semidiametros & centra meridianorum parallelorumque, idque in partibus qualium semidiameter extimi meridiani 100000 continet.

	partitiões diametrorum.	*Centra merid. et Semidiamet. parallelorum.*	*Centra parallel. & semidiamet. meridianorum.*
1	872	5728998	5728820
2	1745	2863624	2865371
3	2618	1908112	1910730
4	3492	1430066	1433558
5	4366	1143005	1147371
6	5240	951436	956676
7	6116	814435	820551
8	6992	711537	718529

9	7870	631374	639244
10	8748	567128	575876
11	9628	514455	543083
12	10510	470462	480973
13	11393	433147	444540
14	12278	401078	413356
15	13165	343205	356370
16	14054	348741	362795
17	14945	327085	342030
18	15838	307768	323606
19	16734	290421	307155
20	17632	274747	292380
21	18533	260508	307155
22	19438	247508	266946
23	20345	235585	255930
24	21256	224603	245859
25	22169	214450	236619
26	23086	205030	228116
27	24007	196261	220268
28	24932	188072	213005
29	25862	180404	206265
30	26794	173205	200000
31	27732	166427	194159
32	28674	160033	188706
33	29621	153986	183607
34	30573	148256	178829
35	31529	142814	174343
36	32491	137638	170130

37	33459	132704	166163
38	34432	127994	162426
39	35411	123489	158900
40	36397	119175	155572
41	37388	115036	152424
42	38386	111061	149447
43	39391	107236	146627
44	40402	103553	143955
45	41421	100000	141421
46	42447	96568	139016
47	43481	93251	136732
48	44522	90040	134562
49	45572	86928	132500
50	46630	83909	130540
51	47697	80978	128675
52	48773	78128	126901
53	49858	75355	125213
54	50952	72654	123606
55	52056	70020	122076
56	53170	67450	120621
57	54295	64940	119235
58	55430	62486	117917
59	56577	60086	116663
60	57735	57735	115470
61	58904	55430	114334
62	60086	53170	113257
63	61280	50952	112232
64	62486	48775	111260

65	63707	46630	110337
66	64940	44522	109463
67	66188	42447	108635
68	67450	40402	107853
69	68728	38386	107114
70	70020	36397	106417
71	71329	34432	105761
72	72654	32491	105146
73	73996	30573	104579
74	75355	28674	104029
75	76732	26794	103526
76	78128	24932	103061
77	79543	23086	102630
78	80978	21255	102234
79	82433	19438	101870
80	83909	17632	101542
81	85408	15838	101246
82	86928	14054	100982
83	88472	12278	100750
84	90040	10510	100550
85	91633	8748	100381
86	93251	6992	100243
87	94869	5240	100109
88	96568	3492	100061
89	98269	1745	100014
90	100000		

4 De descriptione Dorsi, sive posterioris planisphærii partis.

POsterior corporis planisphærii pars vulgo appellari solet dorsum, in quo continentur limbus & volvellum.

Limbus divisus est in 360 gradus, quemadmodum faciei limbus: Sed hic duo conspiciuntur numerorum ordines; nam in superiore ejus parte continentur 24 horarum numeri latinis characteribus signati, idque a termino horæ 12 diei, usque ad 12 horam mediæ noctis, & eodem modo inde procedendo usque ad 12 horam diei; quarum hæ sunt antemeridianæ: illæ vero pomeridianæ horæ.

In inferiore Limbi parte omnes æquinoctialis 360 gradus ordine per numerorum decades exprimuntur, & hæc de Limbo.

Volvellum seorsum in tabula plana & rotenda construitur, unde dorsi pars infra Limbum contenta excavari debet, ut commode in ea volvellum jacere & circumvolvi possit.

Inscribuntur porro volvello signa Zodiaci & menses Romani cum suis diebus, qui singulis zodiaci gradibus respondent: stellæ item cæli illustriores & usui commodiores cum ascriptis

scriptis nominibus et numeris declinationum earundem. tandem horæ inæquales cum scala Altimetra.

Huic parti superimponitur index mobilis cum pinnacidiis, quem dioptram vocant, quæ in centro circa clavem horizontalis lineæ, qui hic eminet, circumvolubilis erit.

Sequitur inscriptio posterioris planisphærij partis.

§ De inscriptione zodiaci.

[Primo ad exteriorem volvelli partem, ex centro ejus, constituantur peripheriæ quatuor venusto ordine dispositæ. Vt nempe in eis nomina signorum zodiaci cum suis characteribus, singuli quoque ejus gradus cum numeris graduum commode inscribi possint. Circuli duobus diametris in centro orthogonalibus in quatuor quadrantes dirimantur. Deinde volvellum dorso planisphærii excavato ita imponatur ut diametri ejus cum limbi diametris ad amussim respondeant, ofarmeturque ne situ hoc suo dimoveri possit.

His ita præparatis, usui nobis erit tabula ascensionis rectæ quinorum graduum zodiaci, quam hic subjicimus.]

Tabula ancensionis rectę pro quinis zodiaci grad.

Aries.			*Leo.*			*Sagittarius.*		
0	0	0	0	122	12	0	237	48
5	4	35	5	127	22	5	243	3
10	9	11	10	132	28	10	248	21
15	13	48	15	137	29	15	253	42
20	18	27	20	142	25	20	259	7
25	23	9	25	147	18	25	264	33
30	27	54	30	152	6	30	270	0
Taurus.			*Virgo.*			*Capricornus*		
0	27	54	0	152	6	0	270	0
5	32	42	5	156	51	5	275	27
10	37	34	10	161	32	10	280	53
15	42	31	15	166	12	15	286	17
20	47	32	20	170	49	20	291	39
25	52	38	25	175	25	25	296	57
30	57	48	30	180	0	30	302	12
Gemini.			*Libra.*			*Aquarius.*		
0	57	48	0	180	0	0	302	12
5	63	3	5	184	35	5	307	22
10	68	21	10	189	11	10	312	28
15	73	43	15	193	48	15	317	29
20	79	7	20	198	27	20	322	25
25	84	33	25	203	9	25	327	18
30	90	0	30	207	54	30	332	6
Cancer.			*Scorpius.*			*Pisces.*		
0	90	0	0	207	54	0	332	6
5	95	27	5	212	42	5	336	51
10	100	53	10	217	34	10	341	33
15	106	17	15	222	31	15	346	12
20	111	39	20	227	32	20	350	49
25	116	57	25	232	38	25	355	25
30	122	12	30	237	48	30	360	0

Officio huius tabulæ gradus zodiaci cum suis signis inscribentur hoc modo.

[Initium Arietis statuendum ad diametrum volvelli transversalem, ubi est hora 6 limbi pomeridiana, a qua etiam hora numeri graduum æquinoctialis in limbo ordine suo incipiunt. Porro ad ejusdem signi quintum gradum inscribendum, numerabis in limbo ascensionem rectam quinti gradus arieti, qua est secundum tabulam nostram 4 gr. 35'. deinde regula ex centro instrumenti ibidem appolita, quintum gradum arietis, lineola brevi deducta, in medio peripheriarum inscriptarum spatio signabis. Similiter regula ex eodem centro ad 10 gradus arietis ascensionem rectam in limbo numeratam, promota, quæ secundum tabulam est 9 11', signabis itidem decimum arietis gradum linea paxillum longiore deducta. Atque ita consequenter alios hujus, & subsequentium signorum gradus quinos secundum eandem tabulam notabis: quo facto unum quodque horum intervallum in quinque æquales partes secernes. Postmodum numerorum decades, nomina, characteresque signorum locis congruentibus adscribes.]

6 De anni mensibus mensiumque diebus, volvello inscribendis.

QVemadmodum zodiacum, gradusq; ejus omnes, ex ascensionibus rectis in tabula repertis, per limbi gradus volvello inseruimus; ita quoque anni menses, mensiumq; dies singulos, per gradus Zodiaci exaratos, beneficio tabulæ sive ephemeridis solis (qualem Tomo 3 cap. 1 exhibemus) inscribemus.

[Constituenda itaque infra zodiacum similis peripheriarum contextura, ut nomina mensium, dies, & numeri dierum eis commode inscribi possint.]

Quorum inscribendorum hæc erit ratio.

[Initio facto a primo mense Ianuarii quære ex ephemeride Solis cap. 1. Tom 3. quis zodiaci gradus initio Ianuar. respondeat, offert sese 10 gr. 10' ♑: eosdē hosce gradus cum suis minutis in zodiaco volvelli quæres, & regula ibidem ex centro admota notabis principium Ianuarii. Similiter ad quintum diem Ianuarii inferendum, quia quinto diei in tabula respondet 15 gr. 23' ♑, numerabis eosdem gradus & minuta in zodiaco, & regula adhibita exarabis ibidem 5 diem Ianuarii. Porro ad 10 Ianuar. diem inscribendū regula ex centro promovebitur ad 0. gr. 16 ♒ uti tabula docet. Et sic consequenter alios tum hujus tum reliquorum mensium quinos dies, secundum eandem tabulam, annotabis. Deinde singula quinorum dierum spatia in 5 æquales partes distribues. Tandem numerorum decades, ubi usus tuerit idemque nomina mensium, locis congruentibus, inscribes.]

7. De inscriptione stellarum.

Stellæ fixæ tum illustriores, & usui commodiores, volvello inseruntur ex tabula ascensionum rectarum & declinationum earundem, qualis extat in Tomo 1 pag. 89.

[Volvello enim in priore adhuc situ existente numerabis in limbo ascensionem rectam stellæ volvello inferendæ: deinde ex centro instrumenti ad numerationis finem regula admota, duces lineam obscuram & deletilem; in hac enim, ubi commodissimum videbitur, asterismus faciendus cum signatura literæ cujusvis alphabeti,

phabeti, & infra asterismum nomen stellæ sub eadem signatura, cum numero declinationis ejusdem inscribendum.]

8 De inscriptione horarum inæqualium.

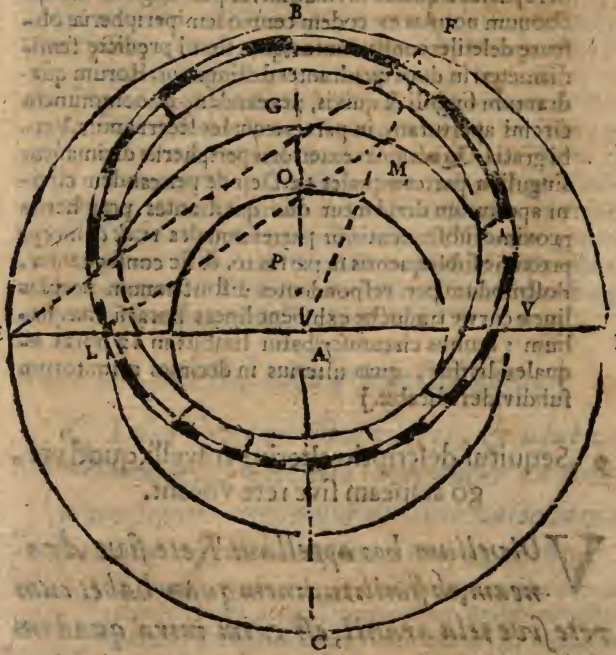
[Inscriptio horarum inæqualium talis est. Ex centro volvelli describitur semiperipheria: quam semidiameteri volvelli in duos quadrantes dirimunt. Porro eædem semidiameteri peripheriæ scriptæ comprehensæ in 12 partes æquales dividantur, & per singulas distinctionum notulas ex eodem centro semiperipheriæ obscurę deletiles constituantur, quas simul prędictę semidiameteri in duos quadrantes distinguunt. Horum quadrantum singuli & quivis, per eandem & communem circini aperturam, in partes æquales secernantur. Verbi gratia. Quadrantes exterioris peripheriæ dirimantur singuli in partes æquales 12. Deinde per eandem circini aperturam dividantur duo quadrantes peripheriæ proxime subsequentis, in partes æquales 11, & deinceps proxime subsequentis in partes 10, & sic consequenter. Postmodum per respondentes distinctionum notulas lineæ curvæ productæ exhibent lineas horarũ inæqualium: quibus circumscribatur limbus in 12 horas æquales divisus, quas ulterius in decimas minutorum subdividere licebit.]

9 Sequitur descriptio alterius volvelli, quod vulgo araneam sive rete vocant.

VOlvellum hoc appellant Rete sive Araneam, ob similitudinem quam habet cum rete sive tela aranii, est enim mira quadam fabrica insculptum & terebratum, continet in se Zodiacum, & stellas quasdam cæli fil-

gentiores, quorum inscriptio sequitur.

[Præpara tibi tabulam planam, tenuem & rotundam, ut dorso astrolabii excavato commode imponi & circumvolvi possit, in qua ex centro A ad exteriorem ejus partem circumscribatur peripheria, quæ circulum tropici capricorni referet, eumque duabis diametris B C & D E, in centro A orthogonalibus, quadrabis: deinde tabellam dorso planisphærii excavato imponito: sic ut diametri ejus cum limbi diametris exactè respon-



deant, obfirmeturque ne situ hoc suo facile dimoveri possit. His ita constitutis. Numerabis in limbo a puncto meridiei. B, ortum versus maximam solis declinationem utpote 23½ gr. ad quod ex centro, A, exeat linea obscura

obscura & deletibis A F, secans tropicum capricorni ad punctum F. Qui & orientis puncto, E, aptata regula secabit eadem diametrum, B C, ad punctum, G, ad quod officio circini ex centro limbi A describe circulum æquinoctialem, qui secabit lineam declinilem, A F, ad punctum M. & diametrum D E ad punctum L, jungatur regula ad M & L puncta, quæ transit diametrum, B C, ad punctum, O, ad quod ex centro, A, circulo descripto, erit is tropicus cancri. Hisce circulis ita descriptis, in diametro B C, quæres per circinum centrum medium inter punctum septentrionale tropici cancri, & meridionale tropici capricorni, centrum illud medium sit P, ex quo per eandem circini expansionem describes circulum, qui exacte transeat æquinoctialem ad V & L puncta, circulus hic repræsentat viam solis sive ecliptican, quare restricto paulum circino ex eodem centro, P, describe alium circulum eclipticæ viciniorem pro singulis nempe, eclipticæ gradibus: & iterum restricto circino duc tertium pro numero graduum: & tandem quartum pro nominibus & characteribus 12 signorum inscribendis. Et hæc de inscriptione zodiaci, qui in partes & signa distribuendus per tabulas ascensionum rectarum, ad eundem prorsus modum ut in volvello priori factum fuit. principium enim arietis statuendum in linea orientis ad punctum occasus, V. hoc est ad horam 6 limbi pomeridianam. Deinde ad ejusdem signi quintum gradum inscribendum, numerabis in limbo ascensionem rectam 5 gr. ♈, quæ est in tabula 4, 35', deinde regula ex centro instrumenti ibidem apposita, signabis quintum gradum arietis: & sic consequenter ut supra docuimus.]

Et hæc de inscriptione zodiaci. Stellæ fixæ illustriores, & usui commodiores inseruntur volvello huic per declinationes & asc. rectas earundem, de quibus extat tabella pag. 89.

Tom. 1. deinde requiritur ad præsens negotium index, qui circa centrum A volubilis in linea ostensoria (quam & fiduciæ lineam appellant) gradus declinationum continet, quorum ordo ab æquatore tam versus austrum, quam septentrionem procedit. Gradus autem illi hoc modo inveniuntur.

[In plano aliquo seorsum ex centro assumpto scribe circulum idq; secundum æquinoctialis in volvello descripti justam magnitudinem, eumque quadrabis duabus B C & D E diametris: diameter B C ultra signum B erit promissa. Deinceps duo quadrantes D B & B E singuli in 90 partes æquales dividantur. Postmodum regula admota ad punctum D & singulos divisionis terminos, signabis ad regulæ contactum singulas in B C

diametro intersectiones: namque sunt gradus declinationum quæsiti, quorum qui sunt a signo ♑ versus centrum decrsum, erunt septentrionales, sed quę extra circulum sursum assurgunt a ♑ incipiendo sunt australes, & horum australium tantummodo 10 gr. assumuntur, reliqui sunt inutiles. Tandem officio circini traducito gradus horæ in indicem ad lineam fiduciæ, quibus solito more numeros denariorum adscribe, incipiendo ab æquinoctiali utrinque tam in partem australem quam septentrionalem.]

Officio hujus indicis stellas facillimo negotio collocabis in volvellum.

Exempli gratia.

[Propositum est inscribere stellam fixam quæ dicitur Sirius sive canis major. Ascensio recta hujus stellæ in tabula reperitur 97 gr. 15'. Hosce a centilionũ gradus numerabis in limbo ab hora 6 pomeridiana incipiendo, utpote secundum numerorum seriem, termino numerationis admove indicem, in cujus gradibus quære deinceps declinationem ejusdem stellæ quæ est in tabula 15 grad. 16' Australis: quare in indice hos declinationum gra. ab æquatore sursum numerabis, & ibidem erit situs sive cacumen stellæ.]

Sequitur lemma nobilissimum, cujus solius beneficio problemata Astronomica, sequentia nono proposita, per circinũ et regulã solvũtur.

LEMMA.

In data sive descripta circuli peripheria arcum quotlibet gradus graduumque partes complectentem numerare sive constituere: Et contra quot gradus graduumque partes in quovis arcu peripheriæ datæ

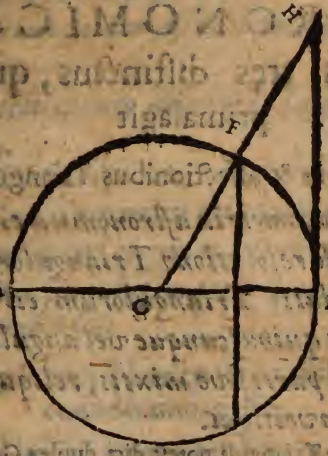
contineantur cognoscere, etiamsi data peripheria in gradus divisa non sit.

Hoc lemma proponitur a Cristophoro Clavio mathematico solertissimo in Astrolabio *de quo volumen doctissimum conscripsit, idemque absolvit per plurimas quadrantes in eadem planitie descriptas. verum multo expeditius hoc negotium perficietur per semicirculum ad id præparatum, cujus schema hic ostenditur, ejusque descriptionem exhibuimus suo finem Tomi 1 pagina 237. Per usum itaque hujus instrumenti propositum Lemma omnium facillime exsequeris ut sequitur.*

[Sit peripheria descripta cujus diameter A B per centrum C ducta, in qua ab eadem diametro numerando assumendus, sit arcus 58 gr. id quod sæpissime in sequenti tomo faciendum erit, fiet autem hoc modo. Semicircu-

lus

lus præparatus ita peripheriæ descriptæ accommodandus erit, ut latus ejus rectum peripheriæ diametro A B:



nec non & centrum centro respondeant. Deinde inter partes semicirculi divisas, incipiendo ab A B diametro, arcum propositum 58 gr. numerato, & terminus numerationis signetur litera H. postmodum, semicirculo remoto, ex centro peripheriæ C & per signaturam H educenda recta C H quæ secabit periph. datam in F: unde arcus ejus B F 85 gr. continebit. estq; primum lemmatis membrum absolutum.

VICISSIM, si desideras scire quot gradus arcus B F in peripheria data comprehendat: educes ex centro C per terminum F lineam C H. Deinde semicirculo centro suo juxta modum præscriptum ad diametrum A B accommodato, considerabis quotum gradum, a diametro numeratum, linea C H semicirculi peripheriæ pertranseat. Numerus enim ille gradum propositum peripheriæ arcum B F mensurabit.]

TRACTATVS BREVISSIMVS

TRIGONOMETRIAE ASTRONOMICAE:

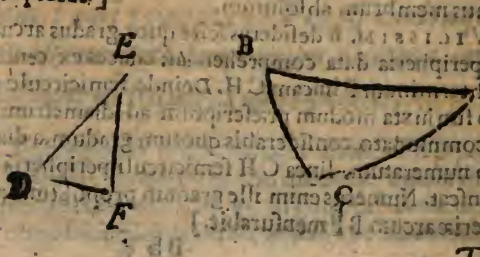
In partes tres distinctus, quarum prima agit

De generibus & affectionibus Triangulorum.

1. *Trigonometria astronomica est doctrina de resolutione Triangulorum.*

2. *Resolutio Triangulorum est quæ ex datis tribus quibuscunque vel angulis & lateribus, sive puris sive mixtis, reliqua latera incognita investigat.*

[Dimentio Trianguli potest dici duplex Geodetica & Astronomica. Geodetica est de investigatione areæ ipsius. Astronomica est de investigatione laterum & angulorum ex tribus tamen datis & cognitis. Vt autem proportionis aurea regula ex datis & concessis tribus numeris, quartum ignotum exhibet: sic hæc doctrina ex datis & concessis tribus, non unum ignotum, sed tria reliqua in proposito solvendoque triangulo reperit & explorat.]



3 Trian-

3. *Triangulum est figura tribus lateribus tres angulos comprehendens.*

[Vt figuræ A B C & D E F.]

4. *Triangulum est vel rectilineum vel sphæricum.*

5. *Rectilineum cujus tria latera sunt lineæ rectæ.*

[Vt figura D E F.]

6. *Sphæricum cujus tria latera sunt segmenta sive arcus trium maximorum sphæræ circulorum singulatim semicirculo minores.*

[Vt figura A B C.]

In Triangulo tum sphærico tum rectilineo primo consideramus partes.

7. *Trianguli partes sunt latera et anguli.*

8. *Latera trianguli rectilinei sunt lineæ rectæ; sed sphærici trianguli Latera (ut dictum) sunt maximorum circulorum arcus, sive segmenta singulatim semicirculo minora.*

9. *Circulus sphæræ maximus est, qui sphæram circa centrum ambiens eam in duo æqualia hæmisphæria secat, adeoque per quadrantem maximi itidem circuli a suis polis distat.*

[Notandæ hic sunt tres proprietates, quibus circulus maximus a minori differt. Primo circa centrum sphæram ambit. 2. Sphæram in æqualia hemisphæria secat. 3. A suis polis per circuli maximi quadrantem distat.]

Axiom

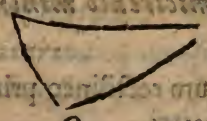
Axioma de circulis.

10. *Si maximus sphæræ circulus per maximi polos transeat, ipsi normalis est, & contra 20 p. 3. Regiom.*

Distinctio laterum.

11. *Distinguuntur trianguli latera in crura & basin.*

12. *Crura sunt duo latera angulum aliquem comprehendentia.*



[Vt latera AB & AC cõprehendentia angulum BAC dicuntur ejusdem anguli crura: sic latera AB & BC sunt crura anguli ABC: itemque latera AC & CB sunt crura ang. ACB.]

13. *Basis est latus angulo oppositum, quem proprie subtendere dicitur.*

[Vt latus BC subtendens angulum sibi oppositum BAC ejusdem basis erit: sic latus AC est basis anguli B: & latus AB basis anguli C.]

14. *Latera ejusdem trianguli, sive sphærici sive recti linei, majora majores angulos subtendunt: subintellige, & minora minores; & æqualia æquales.*

15. *Trianguli duo quælibet latera sunt majora reliquo 37 p. 3 Regiom.*

16. *Trianguli sphærici tria latera sunt minora duobus semicirculis 39 p. 3 Regiom.*

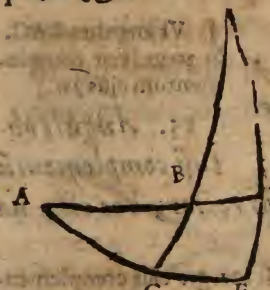
17. *Tri-*

De Angulis.

17. *Angulus est figura duobus cruribus comprehensa.*

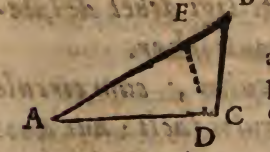
Mensura Anguli.

18. *Anguli amplitudinem in sphærico Triangulo mensurat arcus maximi circuli ex angulo tanquam polo descripti, inter crura quadrante tenus continuata interceptus* 34 *p.* 4 *Regiom.*



[Vt in triangulo sphærico ABC, basis BC non mensurat angulum BAC, sed arcus ED interceptus inter crura AB & AC quadrante tenus, usq; nimirum ad pũcta, D & E prolongata, vide Regiom. 34. 4. item 4. p. 5.]

In Triangulis rectilineis nulla cruriũ continuatione opus.



[Vt in triangulo rectilineo ABC angulum A mensurat arcus peripheriæ DE ex puncto angulari, A, descriptæ.]

Divisio anguli.

19. *Angulus est vel rectus vel obliquus.*

20. *Angulus rectus est, cujus amplitudo est quadrans circuli sive* 90 *gr.*

21. *Angu-*

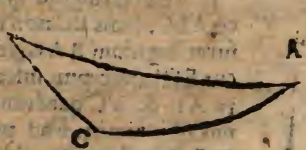
21. *Angulus obliquus, est vel obtusus, vel acutus.*

22. *Angulus obtusus, cujus amplitudo est arcus quadrante major.*

23. *Angulus acutus, cujus amplitudo est arcus quadrante minor.*

De complementis angulorum.

24. *Complementum anguli acuti est quod ipsi ad 90 gr. deest.*



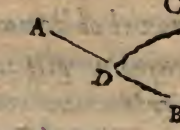
[Vt angulus, BAC, sit 20 gr. erit complementum ejus 70.]

25. *Anguli obtusi complementū est quod ipsi deest ad duos rectos, hoc est, ad 180. gr.*

[Vt angulus, ACB obtusus sit 100 gr. erit complementum ejus 80.]

26. *Idem quoque intelligi debet de laterum complementis trianguli sphær.*

27. *Si maximus circulus, cum circulo maximo concurrens, angulos facit; aut duos rectos, aut duobus rectis æquales efficiet.*



[Vt C D circulus concurrat circulo A B utpote ad punctum D; anguli itaque ADC & CDB si non sunt recti, erunt tamen simul sumpti duobus rectis æquales.]

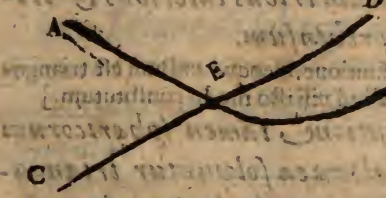
Idem

Idem quoq; intelligi debet, de lineis rectis.

28. *Angulorum ex concursu maximorum circulorum vel linearum rectarum factarum alter ad alterius est complementum ad duos rectos.*

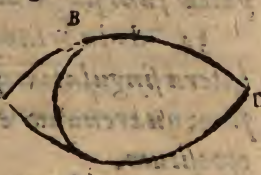
[Vt angulus CDB est complementum ad duos rectos ipsius ADC anguli & vice versa. Vnde si angulus CDB est 80 gr. erit ADC 100.

29. *Pari ratione circulus maximus, circulum itidem maximum, & linea recta lineam itidem rectam intersecans: efficiet quatuor angulos rectos, aut quatuor rectis æquales: quorum qui sunt verticales & per crucem oppositi, sibi mutuo æquantur.*



[Vt in intersectione circulorum A B & C D, quatuor anguli A E D, D E B: B E C & C E A erunt aut 4 recti, aut 4 rectis æquales: insuper anguli D E B & A E C, qui sunt per crucem oppositi, invicem æquantur: quemadmodum quoque anguli A E D & C E B.]

30. *Si anguli sphærici crura continuata concurrant, angulum comprehendent prædicto æqualem, & continuata illa crura erunt semicirculi.*



[Vt

[Vt anguli BAC crura AB & AC in puncto concursus, D, continuata: comprehendent angulum BDC angulo prædicto BAC æqualem: insuper ABD & ACD erunt semicirculi]

31. *Trianguli sphærici tres anguli sunt duobus rectis majores, & 4 rectis minores.* 49 *p.* 3 *Regiom. Cæterum Trianguli rectilinei tres anguli æquantur semper duobus rectis.*

Hactenus de partibus, sequitur de totis triangulis & primum de Sphæricis.

32. *Si trium maximorum sphæræ circulorum segmenta sive arcus, singulatim semicirculo minores, concurrunt, constituunt triangulum sphæricum tribus lateribus & tribus angulis comprehensum.*

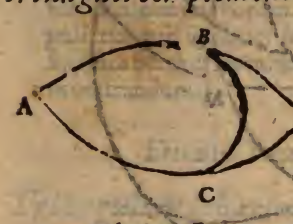
[Patet hoc ex definitione, ideoque nullum est triangulum sphæricum aliud nisi isto modo constitutum.]

33. *In dimentione tamen sphæricorum triangulorum saltem ea solvuntur triangula, quorũ tria latera, vel ad minus duo principalia sunt singulatim quadrante minora.*

34. *Si in triangulo proposito duo vel tria latera singulatim quadrantibus fuerint majora: quærendum erit triangulum minus ei oppositum.*

35. *Triangulum sphæricum quodlibet, ex quovis angulari puncto, habet oppositum sibi trian-*

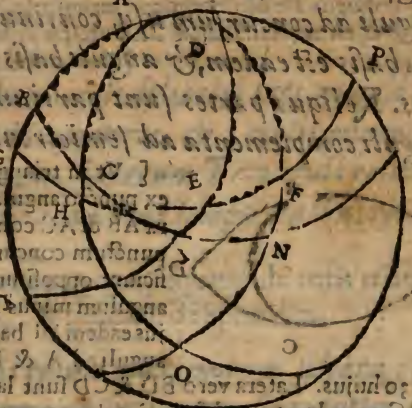
triangulum aliud (quando nempe crura illius anguli ad concursum usq; continuantur.) Cujus basis est eadem, & anguli basis sunt æquales. Reliquæ partes sunt partium prioris trianguli complementa ad semicirculum.



[Vt in triangulo ABC ex puncto angulari A crura AB & AC continuata ad punctum concursus, D: efficiunt oppositum sibi triangulum minus BDC, cujus eadem est basis BC, & anguli ad A & D æquales per 30 hujus. Latera vero BD & CD sunt laterum AB & AC complementa ad semicirculos per eundem. Anguli denique DCB & DBC sunt angulorum ACD & ABC ad duos rectos complementa per 28.]

36. *Trianguli sphærici anguli in latera & contra permutari possunt, assumpto pro angulo maximo ejusdem ad duos rectos complementa.*

[Vt in diagrammate duo conspiciuntur triangula ABC & DEF. quorum anguli unius permutati sunt in latera alterius & vice versa: Namq; latera trianguli DFE singulatim æquantur angulis trianguli ABC pro angulo tamen obtuso & maximo, qui est ad B, complemento ejus ad duos circulos assumpto: & vice versa latera trianguli ABC æquantur angulis trianguli DFE pro angulo DFE maximo ejus complemento AFO assumpto.]



Demonstratio Geometrica hæc est.

[In triangulo ABC amplitudinem anguli A mensurat arcus HG atque amplitudinem anguli C, mensurat arcu NO per 18 hujus. Denique angulum B acutum (qui complementum est anguli B obtusi, & in dato triangulo maximi) mensurat arcus IK.

Porro in triangulo DEF, latus FE æqualis est arcui GH mensuræ anguli A, quia EG & FH sunt ejusdē circuli quadrantes, & commune eorum complementum est EH: similiter latus DF æquatur arcui NO mensuræ anguli C, quia FO & DN sunt ejusdem circuli quadrantes, & commune eorum complementum est FN.

Latus denique DE æquale est arcui IK sive mensuræ anguli acuti B, quia DE & EK sunt quadrantes quorum commune complementum est EI.

Ergo latera trianguli DFE æquantur angulis trianguli ABC pro angulo ABC maximo ejus complementa IK assumpto. Conversa hujus pars eadem ratione demonstratur. Latus enim AC æquatur arcui HO mensuræ

suræ anguli HFO & complementū obtusi DFE. Nam & AH & CO sunt quadrantes, commune complementū est CH: Latus AB æquatur arcui QP mensuræ anguli DEF, nam BQ & AP sunt quadrantes, quorum commune complementum AQ: Latus denique BC æquatur IN mensuræ anguli EDF, sunt enim quadrantes. BI & CN & commune eorum complementum CI. Quare anguli trianguli sphærici in latera, & vicissim. Latera in angulos permutata sunt. Assumpto &c. Quod erat demonstrandum.]

Divisio Trianguli sphærici.

Triangulum sphæricum est: aut rectangulū: aut obliquangulum.

37. *Triangulum sphæricum rectangulum est quod aut unum habet angulum rectum: aut plures uno, utpote duos aut tres.*

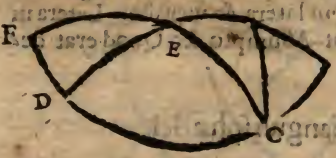
Axiomata.

38. *Si triangulum sphæricum tres habuerit angulos rectos, latera ejus singulatim erūt circuli quadrantes, & contra. De his igitur nulla erit resolutio.*

39. *Si triangulum sphæricum duos habuerit angulos rectos, latera duos angulos rectos subtendentia erunt singulatim quadrantes, & contra. Tertium vero latus erit quadrante majus aut minus, prout angulus tertius fuerit obtusus, aut acutus.*

[Namque latus illud est prædicti anguli mensura per 17 hujus.]

40. *Triangulum rectangulum unum saltem habens angulum rectum, triplicis est differentiæ: aut enim est cum duobus acutis.*



[Vt triang. ABC.]

Aut cum duobus obtusis.

[Vt triang BDC]

Vel cum obtuso & acuto.

[Vt triang. C E D. Angulos enim A & D ponimus esse rectos.]

41. *Trianguli rectanguli sphærici cum duobus angulis acutis latera singula sunt quadrantibus minora.*

[Vt apparet ex triangulo BA^,]

42. *Trianguli rectanguli cum duobus obtusis crura anguli recti sunt singulatim quadrantibus majora: basis vero ejusdem quadrante minus.*

[Vt videre est in triang. BDC.]

43. *Trianguli rectanguli cum obtuso & acuto crura anguli acuti sunt quadrantibus majora. Basis ejusdem anguli acuti est quadrante minus.*

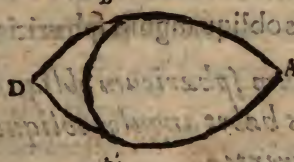
[vt in triang. ECD.

44. *Sed in dimensione triangulorum rectangu-*

ctangulorum ſaltem ea ſolvuntur triangula, quorum tria latera ſunt ſingulatim quadrantibus minora qualia ſunt primi generis: quæ ſunt cum duobus acutis.

Vnde pro reliquorum ſolutione quærendum erit triangulum aliud minus, quod dato triangulo eſt oppoſitum & ſimile per 34 hujus.

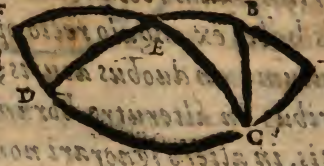
45. *Triangulum rectangulum cum duobus obtuſis habet ex angulo recto oppoſitum ſibi triangulum tum duobus acutis; & quibuſcunque tribus in alterutro horum triangulorum datis, in altero ignorari non poſſunt.*



[Vt triangulũ BDC rectang. ad D, obtuſi angulum ad duos B, & C, angulos: habet oppoſitum minus triangulum BAC rectangulũ ad A, cum duobus acutis B & C angulis: Atque in triangulo majori quibuſcunque tribus datis, etiam tria in triangulo minori data erunt & contra. Namq; partes unius trianguli ſunt partium alterius ad duos ſemicirculos complementa per 35. hujus]

46. *In Triangulo rectangulo cum obtuſo & acuto: opponitur ex angulo acuto triangulum rectangulum minus, quod duos habet acutos, & quæcunque ſunt in alterutro horum data, in altero non ignorantur.*

[Vt in triangulo EDC fingatur angulus D rectus, angulus C acutus, & angulus ad E obtusus, huic triangulo ex angulo acuto C opponitur triangulum EDF minus, cujus angulus D erit rectus, reliqui duo ad E & F acuti: & quæcunq; illic sunt data, hic non ignorantur. Namque anguli oppositi C & F sunt æquales. & angulus acutus FED, est complementum anguli obtusi CED ad duos rectos: insuper quoque latera FE & FD sunt iterum CE & CD ad semicirculos complementa per 35 hujus.]



De Triangulis obliquangulis sphæricis.

47. *Triangulum sphæricum obliquangulum est, quod tres habet angulos obliquos: estque triplicis differentiæ.*

Constat enim aut ex puris acutis, vel obtusis: vel ex his mixtis.

48. *Triangulo sphærico pure acutangulo opponitur triangulum sphæricum cum duobus obtusis, & uno acuto.*

[Vt in diagrammate Trianguli ABC angulus A fingatur acutus: erit in opposito sibi Triangulo BDC angulus D acutus, & anguli ad B, & C, obtusi.]

49. *Triangulo sphærico pure obtusangulo op-*

lo opponitur triangulum sphæricū cum duobus acutis, & uno obtuso, & contra

[Vt in triangulo sphærico BDC, si ponatur angulus D obtusus, ei oppositum triangulum erit cum uno angulo ad A obtuso, & cum duobus ad B & C acutis]

Hactenus de sphæricis Triangulis, sequitur de planis rectilineis.

50. *Quando in planitie quadam tres lineæ rectæ finibus suis se mutuo contingunt. Constituunt triangulum rectilineum tribus lateribus & totidem angulis comprehensum.*

[Patet hoc ex 3 prop.]

51. *Triangulum rectilineum est aut rectangulum aut obliquangulum.*

52. *Rectangulum quod unicū habet angulum rectum.*

[Namque in uno rectilineo triang. duo anguli recti dari non possunt, ut in sphærico, quod patet ex 31 prop.]

53. *Obliquangulum triang. est quod tres habet angulos obliquos.*

54. *Estque vel obtusiangulum: vel acutiangulum. obtusiangulum triangulum est quod unicum habet angulum obtusum: acutangulum est cujus tres anguli sunt acuti.*

TRACTATVS

TRIGONOMETRIAE ASTRONOMICAE,

Pars secunda, de resolutione triangulorum Sphæricorum per Planisphærium.

De resolutione rectangulorum.

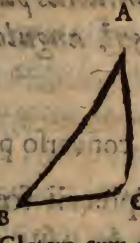
IN triangulis Sphæricis rectangulis, non nisi illa solvuntur triangula, quæ præter rectum duos habent acutos, quorum proinde latera sunt singulatim quadrantibus minora. Namque in triangulis quæ duos aut tres habent angulos rectos, omnia per se innotescunt, per 38, 39 p. 1 hujus.

Deinde pro triangulo rectangulo habente unum vel duos obtusos, quia in eis duo sunt latera singulatim quadrantibus majora per 42 & 43 p. 1. Solvendum erit oppositum ei triangulum minus, quidquid enim in hoc fuerit datum, in illo non ignoratur per 46 & 45 p. 1 hujus.

Probl.

Problema 1.

In triangulo Sphærico rectangulo data basi anguli recti cum angulo alterutro: ipsa latera, & angulum acutum reliquum indagare.



[Sit pro exemplari institutione triangulum Sphæricū ABC rectangulum ad C, qui est 90 gr. per 20 p. 1 hujus. Insuper detur anguli recti basis AB 60 gr. angulus quoque A acutus sit $23\frac{1}{2}$. Reliqua tria ejusdem trianguli nempe AC & BC latera, cum angulo acuto altero ABC, per planisphærium hoc modo explorabis.]

Numera in gradibus limbi a parallelo recto versus polum angulum datum BAC $23\frac{1}{2}$, *ad finem numerationis regula horizontali admota, numerabis in ejusdem partibus, idq; a centro versus extremitatem, basin datam AB* 60 *gr. & mox inter parallelos a recto sive æquatore, usque ad hoc numeratum in horizonte punctum, habebis mensuram lateris angulum datum subtendentis BC* $20\frac{1}{2}$. *Insuper inter meridianos a recto usque ad idem numerationis punctum habebis alterum latus, quod dato angulo adiacet AC* $57\frac{3}{4}$.

reliqui B 77¼, & partes regulæ, quæ numerantur ab extremitate ejus, usque ad idem intersectionis punctũ, indicant latus quod angulum datum subtendit, nempe latus BC 20½.

Porro numerato in partibus regulæ sic quiescentis, a centro versus extremitatem ejus, basin datam AB 60, & terminus hujus numerationis ostendet inter parallelos latus alterum angulo dato AC adiacens, numerando ab æquatore gradus 57¼: & inter meridianos a recto extrorsum usque ad eundem terminum numerando, rursus indicatur latus B 20½. Hic operandi modus est planè conversus cum antecedenti.

Tertius modus.

Numera inter meridianos ab extimo introrsum amplitudinem anguli dati A 23½, & inter parallelos a polo deorsum basin AB 60 gr. regulam deinde ad communem circulorũ numeratorum contactum admove. Quæ isto modo continebit in suis partibus, ab extremitate usque ad contactus punctum numeratis, latus angulo dato oppositum BC 20½, & ostendet in gradibus limbi a polo numeratis latus alterum AC 57¼.

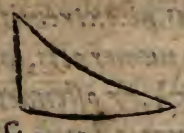
Manente

Manente porro regula in hoc situ, numera in partibus ejus a centro versus extremitatem amplitudinem anguli dati A 23½, & exhibebitur inter parallelos a polo usque ad terminum numeratum angulus acutus alter B 77¼, & inter meridianos a recto numerando denuo sese offert latus B C 20½.

Ex his tribus operandi modis omnis præterea triangulorum Sphæricorum rectangulorum resolutio perficitur, per modum permutationis.

Problema 2.

Trianguli Sphærici Rectanguli data anguli recti basi cum latere alteruito: latus reliquum, & angulos concludere.



[Exempli gratia, in triangulo Sphærico A B C rectangulo ad C (qui est 90 gr.) data basi AB 60 gr. cum latere B C 20½: latus tertium AC & angulos duos ad A & B hoc modo per planisphærium venaberis.]

Numera inter parallelos ab æquatore latus

tus datum BC $20\frac{1}{2}$ *gradum, noteturq; parallelus in quem finit numeratio. Deinde in partibus regulæ Horizontis, incipiendo a centro, supputa basin datam AB* 60, *moveaturque deinceps regula donec punctus numerationis ejusdem ad parallelum numeratum ducatur: Isto enim modo regula ostendet in gradibus limbi ab æquatore numeratis angulum dato lateri oppositum BAC* $23\frac{1}{2}$: *& inter meridianos a recto incipiendo, usque ad communem regulæ cum parallelo prædicto intersectionem, latus alterum AC* $57\frac{1}{4}$ *numerabitur.*

Porro regula manente immota, numera inter meridianos ab extimo introrsum datam basin AB 60 *gr. & contactus meridiani numerati cum regula horizontis ostendet denuo inter suas partes ab extremitate numeratas latus AC. Postmodum numerando parallelos, qui sunt a polo usque eundem meridiani cum horizonte contactum, cognosces angulum alterum B* $77\frac{1}{4}$. Deducta est hæc operatio ex 1. operat. probl. 1.

Alio modo.

Numera inter meridianos ab extimo introrsum basin datam AB 60. *Deinde in regula,*

gula, ab extremitate versus centrum, numera datum latus BC $20\frac{1}{3}$. *Promoveatur deinceps regula donec terminus istius numerationis ad meridianum numeratum perducatur, quæ mox in gradibus limbi ab æquatore versus polum angulum B, inter basin & latus comprehensum, nempe* $77\frac{1}{4}$ *indicabit: Atque inter parallelos a polo usque in eundem terminum angulus lateri dato oppositus A* $23\frac{1}{2}$. *habetur.*

Porro in partibus regulæ sic quiescentis numera, a centro versus limbū, basin datam AB 60. *Habebis inter parallelos a recto usque ad terminū numerationis latus AC* $57\frac{1}{4}$. Deducta hæc operatio ex 2 ratione problema 1.

Tertia Ratio.

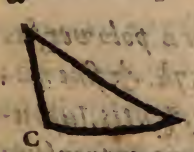
Numera inter parallelos a polo basin datam AB 60: *similiter & in regula ab extremitate introrsum latus BC datum* $20\frac{1}{3}$. *Terminus huius numerationis in regula ad parallelum numeratum perductus, ostendet inter meridianos ab extimo numerando amplitudinem anguli, A, dato lateri oppositi* $23\frac{1}{2}$. *Et regula ostendet in gradibus limbi a polo numeran-*

merando latus reliquum AC $57\frac{1}{4}$.

Porro supputa inter meridianos a recto incipiendo latus BC datum $20\frac{1}{7}$, *& contactus meridiani numerati ostendet in partibus regulæ, a centro extrorsum numeratis, angulum lateri dato oppositum A* $23\frac{1}{2}$: *& inter parallelos a polo usque in idem intersectionis punctum habebis angulum alterum B* $77\frac{1}{4}$. Deducta est hæc operatio ex 3 ration. probl. 1.

Problema 3.

Dato latere quocunque cum angulo ei adjacente: & angulum alterum, & reliqua latera concludere.



[Vt pro exemplo in triangulo rectangulo ABC: latus AC datur $57\frac{1}{4}$ cum angulo adjacente A, $23\frac{1}{2}$. Angulus C rectus per se datus est 90 gr. Quare angulum alterum B, & reliqua AB & BC latera hoc modo concludes.]

Numera in limbo ab æquatore versus polum angulum A datum $23\frac{1}{2}$, *& regula horizontis ad terminum numerationis admota, numerabis inter meridianos incipiendo a recto, la-*

cto, latus datum AC $57\frac{1}{4}$, *& contactus meridiani numerati cum horizonte* ⌣, *in partibus ejusdem a centro numeratis, basin anguli recti AB* 60 *grad. ostendet, & inter parallelos, ab æquatore incipiendo, colliges latus reliquum, angulo dato oppositum B* $20\frac{1}{2}$.

Porro numera in horizonte ab extremitate sua introrsum latus datum AC $57\frac{1}{4}$, *& habebis ad hunc numerationis terminum inter parallelos a polo incipiendo angulum lateri dato oppositum B* $77\frac{1}{4}$, *& inter meridianos, similiter ab extimo incipiendo, colliges denuo basin anguli recti AB* 60 *gr. Primum hujus problematis membrum est permutatum ex* 1 *ratione* 1 *prob. posterius vero membrum est inversum* 2. *rationis* 1. *problematis.*

Secunda ratio.

Numera in gradibus limbi a polo versus æquatorem latus datum AC $57\frac{1}{4}$, *& fini numerationis admota regula horizontis, supputabis inter meridianos ab extimo introrsum angulum datum A* $23\frac{1}{2}$, *notando diligenter meridiani hujus cum horizontali linea intersectionem. Partes enim regulæ ad hanc usque intersectionem ab extremitate numerate,*

ratæ, exhibent mensuram lateris datum angulum subtendentis BC $20\frac{1}{7}$.

Et paralleli, qui a polo usque eandem intersectionem numerantur, indicant basin anguli recti AB 60 grad.

Porro numera in partibus regulæ sic quiescentis a centro versus extremitatem angulum datum A $23\frac{1}{2}$, *& habebis in parallelos a polo usque ad hunc numerationis terminum, angulum BC, qui lateri dato opponitur* $77\frac{3}{4}$, *atque inter meridianos a recto numerando, denuo se offert latus angulo dato oppositum BC* $20\frac{1}{7}$. *Permutata est hæc operatio ex* 3. *rat.* 1. *prob.*

Tertia ratio, quæ est antecedenti inversa.

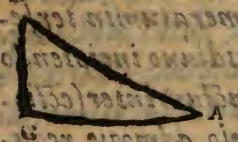
Numera inter parallelos a polo versus æquatorem angulum datum A $23\frac{1}{2}$, *& inter meridianos, parallelum numeratum in terfecantes, numera a recto meridiano incipiendo latus datum AC* $57\frac{1}{4}$: *ad punctum intersectionis meridiani cum parallelo admove regulam: quæ mox in limbo demonstrabit latus angulo dato oppositum BC* $20\frac{1}{7}$ *a polo numerando: Partes regulæ, quæ sunt a centro usque*

ad idem intersectionis punctum indicant angulum alterum, & lateri dato oppositum B 77¾.

Porro ab extremitate regulæ immotæ numera in partibus suis latus datum AC 57½, & denuo conspicies inter meridianos ab exitu introrsum numerando angulum B 77¾, & inter parallelos a polo ad idem usque numerationis punctum offert se basis anguli recti AB 60 gr.

Problema 4.

Dato latere quocunque, & angulo ei opposito: & basin, & latus, & alterum angulum colligere.



[Dentur in præscripto ABC rectangulo latus BC 20½, & angulus ei oppositus A 23½. Reliqua colligentur ad eundem prorsus modum, quemadmodum in problem. primo operati fuimus.]

Ratio 1.

Numera in gradibus limbi ab æquatore versus

versus polum angulum datum A $23\frac{1}{2}$, *& regula eo deducta, supputa inter parallelos ab æquatore incipiendo latus datũ BC* $20\frac{1}{3}$. *Intersectio hujus numerati paralleli cum horizonte ostendet in partibus ejus, a centro numeratis, basin anguli recti AB* 60 *gr. atque inter meridianos a recto incipiendo usque ad eandem intersectionem cognosces latus quod angulo dato adjacet AC* 57°.

Porro pro angulo altero B inveniendo, numerabis in partibus regulæ ab extremitate latus AC jam acquisitum $57\frac{3}{4}$: *& habebis inter parallelos a polo usque ad idem numeratum punctum angulum quæsitum B* $77\frac{3}{4}$.

Ratio 2.

Numera inter parallelos a polo versus æquatorẽ angulũ datũ A $23\frac{1}{2}$. *Deinde in regula ab extremitate introrsum numeretur latus datum BC* $20\frac{1}{3}$, *& hic terminus ad parallelum numeratum perductus ostendet inter meridianos ab extimo basin anguli recti AB* 60 *gradus: & regula indicabit in gradibus limbi ab æquatore amplitudinem anguli alterius B* $77\frac{3}{4}$.

TRACTATUS

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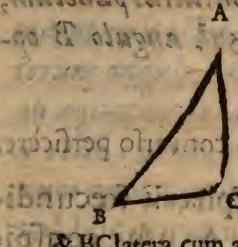
Deinde pro triangulo rectangulo habente unum vel duos obtusos, quia in eis duo sunt latera singulatim quadrantibus majora per 42 & 43 p. 1. Solvendum erit oppositum ei triangulum minus, quidquid enim in hoc fuerit datum, in illo non ignoratur per 46 & 45 p. 1 hujus.

Probl.

Problema 1.

In triangulo Sphærico rectangulo data basi anguli recti cum angulo alterutro: ipsa latera, & angulum acutum reliquum indagare.



[Sit pro exemplari institutione triangulum Sphæricũ ABC rectangulum ad C, qui est 90 gr. per 20 p. 1 hujus. Insuper detur anguli recti basis AB 60 gr. angulus quoque A acutus sit $23\frac{1}{2}$. Reliqua tria ejusdem trianguli nempe AC & BC latera, cum angulo acuto altero ABC, per planisphærium hoc modo explorabis.]

Numera in gradibus limbi a parallelo recto versus polum angulum datum BAC $23\frac{1}{2}$, *ad finem numerationis regula horizontali admota, numerabis in ejusdem partibus, idq; a centro versus extremitatem, basin datam AB* 60 *gr. & mox inter parallelos a recto sive æquatore, usque ad hoc numeratum in horizonte punctum, habebis mensuram lateris angulum datum subtendentis BC* $20\frac{1}{2}$. *Insuper inter meridianos a recto usque ad idem numerationis punctum habebis alterum latus, quod dato angulo adiacet AC* $57\frac{3}{4}$.

reliqui B 77½, & partes regulæ, quæ numerantur ab extremitate ejus, usque ad idem intersectionis punctũ, indicant latus quod angulum datum subtendit, nempe latus BC 20½.

Porrò numerato in partibus regulæ sic quiescentis, a centro versus extremitatem ejus, basin datam AB 60, & terminus hujus numerationis ostendet inter parallelos latus alterum angulo dato AC adiacens, numerando ab æquatore gradus 57¼: & inter meridianos a recto extrorsum usque ad eundem terminum numerando, rursus indicatur latus B 20½. Hic operandi modus est planè conversus cum antecedenti.

Tertius modus.

Numera inter meridianos ab extimo introrsum amplitudinem anguli dati A 23½, & inter parallelos a polo deorsum basin AB 60 gr. regulam deinde ad communem circulorũ numeratorum contactum admove. Quæ isto modo continebit in suis partibus, ab extremitate usque ad contactus punctum numeratis, latus angulo dato oppositum BC 20½, & ostendet in gradibus limbi a polo numeratis latus alterum AC 57¼.

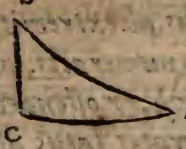
Manente

Manente porro regula in hoc situ, numera in partibus ejus a centro versus extremitatem amplitudinem anguli dati A 23½, & exhibebitur inter parallelos a polo usque ad terminum numeratum angulus acutus alter B 77¼, & inter meridianos a recto numerando denuo sese offert latus B C 20½.

Ex his tribus operandi modis omnis præterea triangulorum Sphæricorum rectangulorum resolutio perficitur, per modum permutationis.

Problema 2.

Trianguli Sphærici Rectanguli data anguli recti basi cum latere alteruito: latus reliquum, & angulos concludere.



[Exempli gratia, in triangulo Sphærico A B C rectangulo ad C (qui est 90 gr.) data basi AB 60 gr. cum latere B C 20½: latus tertium AC & angulos duos ad A & B hoc modo per planisphærium venaberis.]

Numera inter parallelos ab æquatore latus

tus datum BC 20½ gradum, noteturq; parallelus in quem finit numeratio. Deinde in partibus regulæ Horizontis, incipiendo a centro, supputa basin datam AB 60, moveaturque deinceps regula donec punctus numerationis ejusdem ad parallelum numeratum ducatur: Isto enim modo regula ostendet in gradibus limbi ab æquatore numeratis angulum dato lateri oppositum BAC 23½: & inter meridianos a recto incipiendo, usque ad communem regulæ cum parallelo prædicto intersectionem, latus alterum AC 57¾ numerabitur.

Porro regula manente immota, numera inter meridianos ab extimo introrsum datam basin AB 60 gr. & contactus meridiani numerati cum regula horizontis ostendet denuo inter suas partes ab extremitate numeratas latus AC. Postmodum numerando parallelos, qui sunt a polo usque eundem meridiani cum horizonte contactum, cognosces angulum alterum B 77¼. Deducta est hæc operatio ex 1. operat. probl. 1.

Alio modo.

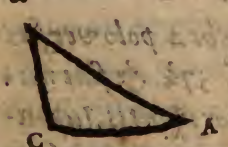
Numera inter meridianos ab extimo introrsum basin datam AB 60. Deinde in regula,

merando latus reliquum AC $57\frac{3}{4}$.

Porro supputa inter meridianos a recto incipiendo latus BC datum $20\frac{1}{2}$, *& contactus meridiani numerati ostendet in partibus regulæ, a centro extrorsum numeratis, angulum lateri dato oppositum A* $23\frac{1}{2}$: *& inter parallelos a polo usque in idem intersectionis punctum habebis angulum alterum B* $77\frac{3}{4}$. Deducta est hæc operatio ex 3 ration. probl. 1.

Problema 3.

Dato latere quocunque cum angulo ei adjacente: & angulum alterum, & reliqua latera concludere.



[Vt pro exemplo in triangulo rectangulo ABC: latus AC detur $57\frac{3}{4}$ cum angulo adiacente A, $23\frac{1}{2}$. Angulus C rectus per se datus est 90 gr. Quare angulum alterum B, & reliqua AB & BC latera hoc modo concludes]

Numera in limbo ab æquatore versus polum angulum A datum $23\frac{1}{2}$, *& regula horizontis ad terminum numerationis admota, numerabis inter meridianos incipiendo a recto, la-*

cto, latus datum A C $57\frac{1}{4}$, *& contactus meridiani numerati cum horizonte* ⌣, *in partibus ejusdem a centro numeratis, basin anguli recti AB* 60 *grad. ostendet, & inter parallelos, ab æquatore incipiendo, colliges latus reliquum, angulo dato oppositum B* $20\frac{1}{4}$.

Porro numera in horizonte ab extremitate sua introrsum latus datum A C $57\frac{1}{4}$, *& habebis ad hunc numerationis terminum inter parallelos a polo incipiendo angulum lateri dato oppositum B* $77\frac{1}{4}$, *& inter meridianos, similiter ab extimo incipiendo, colliges denuo basin anguli recti AB* 60 *gr. Primum hujus problematis membrum est permutatum ex* 1 *ratione* 1 *prob. posterius vero membrum est inversum* 2. *rationis* 1. *problematis.*

Secunda ratio.

Numera in gradibus limbi a polo versus æquatorem latus datum AC $57\frac{1}{4}$, *& fini numerationis admota regula horizontis, supputabis inter meridianos ab extimo introrsum angulum datum A* $23\frac{1}{2}$, *notando diligenter meridiani hujus cum horizontali linea intersectionem. Partes enim regulæ ad hanc usque intersectionem ab extremitate numerate,*

ratæ, exhibent mensuram lateris datum angulum subtendentis BC $20\frac{1}{7}$.

Et paralleli, qui a polo usque eandem intersectionem numerantur, indicant basin anguli recti AB 60 grad.

Porro numera in partibus regulæ sic quiescentis a centro versus extremitatem angulum datum A $23\frac{1}{2}$, *& habebis in parallelos a polo usque ad hunc numerationis terminum, angulum BC, qui lateri dato opponitur* $77\frac{3}{4}$, *atque inter meridianos a recto numerando, denuo se offert latus angulo dato oppositum BC* $20\frac{1}{7}$. *Permutata est hæc operatio ex* 3. *rat.* 1. *prob.*

Tertia ratio, quæ est antecedenti inversa.

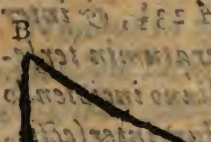
Numera inter parallelos a polo versus æquatorem angulum datum A $23\frac{1}{2}$, *& inter meridianos, parallelum numeratum in terfecantes, numera a recto meridiano incipiendo latus datum AC* $57\frac{1}{4}$: *ad punctum intersectionis meridiani cum parallelo admove regulam: quæ mox in limbo demonstrabit latus angulo dato oppositum BC* $20\frac{1}{7}$ *a polo numerando: Partes regulæ, quæ sunt a centro usque*

ad idem intersectionis punctum indicant angulum alterum, & lateri dato oppositum B 77¾.

Porro ab extremitate regulæ immotæ numera in partibus suis latus datum AC 57½, & denuo conspicies inter meridianos ab exitio introrsum numerando angulum B 77¾, & inter parallelos a polo ad idem usque numerationis punctum offert se basis anguli recti AB 60 gr.

Problema 4.

Dato latere quocunque, & angulo ei oppositio: & basin, & latus, & alterum angulum colligere.



[Dentur in præscripto ABC rectangulo latus BC 20½, & angulus ei oppositus A 23½. Reliqua colligentur ad eundem prorsus modum, quemadmodum in problem. primo operati fuimus.]

Ratio 1.

Numera in gradibus limbi ab æquatore versus

versus polum angulum datum A $23\frac{1}{2}$, *& regula eo deducta, supputa inter parallelos ab æquatore incipiendo latus datũ BC* $20\frac{1}{2}$. *Intersectio hujus numerati paralleli cum horizonte ostendet in partibus ejus, a centro numeratis, basin anguli recti AB* 60 *gr. atque inter meridianos a recto incipiendo usque ad eandem intersectionem cognosces latus quod angulo dato adjacet AC* 57°.

Porro pro angulo altero B inveniendo, numerabis in partibus regulæ ab extremitate ⌣ *latus AC jam acquisitum* $57\frac{3}{4}$: *& habebis inter parallelos a polo usque ad idem numeratum punctum angulum quæsitum B* $77\frac{3}{4}$.

Ratio 2.

Numera inter parallelos a polo versus æquatorẽ angulũ datũ A $23\frac{1}{2}$. *Deinde in regula ab extremitate introrsum numeretur latus datum BC* $20\frac{1}{2}$, *& hic terminus ad parallelum numeratum perductus ostendet inter meridianos ab extimo basin anguli recti AB* 60 *gradus: & regula indicabit in gradibus limbi ab æquatore amplitudinem anguli alterius B* $77\frac{3}{4}$.

Porro regula manente in suo situ, numera inter meridianos a recto versus extimum latus BC datum, & punctum intersectionis hujus numerati paralleli cum horizonte ostendet denuo in partibus ejusdem regulæ basin AB 60, & inter parallelos, ab æquatore usque ad idem punctum numerando, Cognoscetur latus reliquum AC, quod nempe angulo dato adiacet 57¾. Permutata hæc ratio est cum 2 rat. prob. 1.

Ratio 3.

Numera inter meridianos ab extimo introrsum angulum A datum 23½, & in partibus regulæ ab extremitate versus centrum supputa latus oppositum datū 20¼, terminus iste ad meridianum numeratū ductus, ostendet inter parallelos a polo numerando basin anguli recti AB 60. Atque in gradibus limbi a polo usque ad regulæ contactum habebitur latus dato angulo adiacens AC 57¾.

Porro in partibus regulæ quiescentis numera a centro incipiendo angulum datum A 23½: Nam inter parallelos a polo usque ad terminum numerationis habebitur angulus acutus alter B 77¼.

Ratio

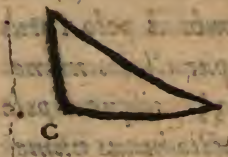
Ratio 4.

Numera in gradibus limbi a polo latus datum B C 20½ atque inter parallelos numeretur angulus oppositus A 23½, idque a polo versus æquatorem, et intersectio hujus numerati paralleli cum regula ostendet inter partes ejus a centro numeratas angulum alterū, qui lateri dato adiacet B 77¼, & inter meridianos, a recto ad idem intersectionis punctū, habebitur latus A C 57¼.

Porro manente regula numera inter meridianos ab extimo introrsum angulum B modo inventum, & habebis inter parallelos, a polo usque ad contactum numerati meridiani cum horizonte, basin anguli recti A 66 gr. & inter partes regulæ ab extremitate usque ad idem contactus punctum rursus offert sese A C latus 57¼, permutata est hæc ratio a 3 rat. 3. prob.

Problema 5.

Datis cruribus anguli recti, basin & angulos concludere.



[Dentur in præscripto triangulo crus Ang. recti AC $57\frac{3}{4}$ & crus alterum BC $20\frac{1}{2}$, Basin & utrumq; angulum acutum hoc modo colliges.]

Numera inter meridianos, a recto crus datum AC $57\frac{3}{4}$, *& inter parallelos ab æquatore crus alterum BC* $20\frac{1}{2}$, *& communi circulorum intersectioni regulam admove. quæ mox in limbo demonstrat ab æquatore numerando angulum A* $23\frac{1}{2}$, *qui cruri BC, inter parallelos numerati, opponitur; partes regulæ a centro usque ad circulorum intersectionem numeratæ, indicant basin anguli recti AB* 60. *grad.*

Porro ut habeatur angulus reliquus B, numerabis in partibus regulæ quiescentis crus quod angulo quæsito opponitur AC $57\frac{3}{4}$: *& terminus numerationis ostendet denuo inter meridianos ab extimo introrsum basin AB* 60. *gr. nec non & inter parallelos a polo usque ad eundem numerationis terminum offert se angulus B. desideratus* $77\frac{1}{4}$. *Ratio hæc permutatur ex* 1 *rat. prob.* 1.

Secundus modus.

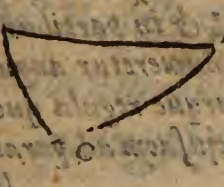
Numera in limbo a polo crus datum AC $57\frac{3}{4}$,

57½, & eo promovere regula, numeretur in eodem ab extremitate introrsum crus alterum BC 20½: & terminus iste ostendet inter meridianos ab extimo angulum A 23½, qui nempe lateri in limbo numerato adjacet, & inter parallelos, a polo usque ad eundem terminum; numerabitur basis AB 60 gr.

Porro ut habeatur angulus alter B, numerabis inter meridianos a recto versus extimum crus quod ang. quæsito adjacet BC 20½, & contactus hujus cum regula ostendet inter parallelos a polo numerando angulum desideratum B 77½: nec non & inter partes regulæ a centro numerata dentro angulus A 23½ sese offeret.

Problema 6.

Trianguli Sphærici rectanguli datis angulis, latera singula colligere.



[In triangulo sphærico rectangulo ABC, angulus, B, acutus sit datus 77½ & alter acutus A sit 20½, latera singulatim inde colliguntur hoc modo.]

Numera in limbi gradibus ab æquatore angulum alterutrum datum nempe A $23\frac{1}{2}$, *& regula ibidem admota numera inter parallelos a polo deorsum angulum alterum B* $77\frac{1}{4}$. *Intersectio hujus numerati parallelicum regula ostendet in partibus ejusdem ab extremitate numeratis latus AC* $57\frac{1}{4}$, *qui angulum inter parallelos numeratum subtendit, atque inter meridianos ab extimo usque ad eandem intersectionem habetur anguli recti basis AB* 60.

Porro, regula manente, numera in ejus partibus, a centro versus extremitatem, basin AB jam repertam 60, *& mox inter parallelos, a recto usque ad terminum hujus numerationis, se offert latus alterum BC* $20\frac{1}{3}$ *& inter meridianos, a recto, denuo exhibetur latus AC* $57\frac{1}{4}$. *Ratio constat ex* 1 *&* 2 *p.* 1.

Secunda ratio.

Numera inter parallelos a polo angulum alterutrum datum B $77\frac{1}{4}$ *& in partibus regulæ a centro extrorsum numeretur angulus alter A* $23\frac{1}{2}$. *Moveaturque regula quoad terminus numerationis ejusdem ad parallelum*

lum itidem numeratum adductus sit, quæ mox in limbi gradibus a polo ostendet latus AC $57\frac{3}{4}$ *subtendens angulum inter parallelos numeratum: & meridiani qui sunt a recto usque ad terminorum intersectionem indicant latus alterum B* $20\frac{1}{4}$.

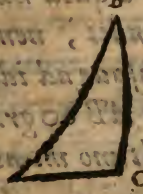
Porro immota regula numera inter meridianos angulum A $23\frac{1}{2}$ *ab extimo versus rectum. Contactus numerati meridiani cum horizonte ostendet in partibus ejusdem ab extremitate numeratis latus B C, quod hunc numeratum angulum A subtendit, nempe* $20\frac{1}{4}$: *& inter parallelos a polo usque ad idem contactus punctum habes basin AB* 60 *grad. Permutata est hac ratio ex ultimo membro 3 modi prob.* 1.

Posteriorum duorum problematum duos saltem modos operandi demonstravimus: Ratione inversionis per se quis facile alios duos perficiet.

De Resolutione Triangulorum Sphæricorum Obliquangulorum.

Problema 7.

Triangulí obliquanguli Sphęrici dato angulo alterutro cum duobus ejuſdem cruribus ipſum conſtituentibus. Baſin & angulos reliquos inquirere.



[Sit pro exemplari inſtitutione triAngulum Sphæricum obliquangulum ABC, in quo angulus BAC ſit cognitus 30 grad. cum cruribus ejuſdem anguli, nempe, AB, 60 grad. & AC 50 grad. datis: Reliquos angulos, nempe ABC. & ACB cum angulí data baſi BC, hoc modo venaberis.]

Numera in gradibus limbi incipiendo ab æquatore verſus polum arcticum, idque ad dextram tui partem, crus datum alterutrum, nempe AC 50 gr. atque eo colloca regulam, deinde inter parallelos ab eodem polo arctico numerabis crus alterum AB 60. Conſequenter inter meridianos, parallelum numeratũ interſecantes, ab extimo & parte tibi ſiniſtra verſus dextram introrſum angulum crucribus comprehenſum 30 gr. ſupputabis, & ad

commu-

communem meridiani cum parallelo intersectionem apicem brachioli perducito. His ita peractis traducatur regula ad æquatoris lineam. Isto enim modo apex brachioli ostendet inter parallelos a polo numerando basin anguli dati BC 26½ gr. & inter meridianos ab extimo et dextro versus sinistram partem indicabit amplitudinem anguli C, qui lateri in limbo numerato adjacet, estq; 103 gr.

Sed hoc loco semel monendum quod per meridianum dextrum, sive per dextrã instrumenti partẽ intelligimus eam, quam dextra tua manus tenet: Sicq; sinistrã, quæ ad sinistram manum exsistit.

Porro ut angulum alterũ B cognoscas invertes operandi formam, hoc est pro crure AC in limbo gradibus numerato numerabis crus AB 60, regulã ibidẽ ducendo; & inter parallelos supputabis crus AC 50, ut supra. Consequẽter supputabis inter meridianos ab extimo dextrorsũ ang. datũ A 30. gr. atq; induce ad cõmunẽ circulorũ numeratorũ intersectionẽ applicato, transferes regulã ad parallelũ rectũ: isto n. modo index inter parallelos a polo ostendet basin anguli dati BC 26½, ut supra,

atque

atque inter meridianos ab extimo & dextro versus sinistram partem indicabit angulum B desideratum 59½.

Secunda ratione & priori conversa idem absolvere.

[Idem problema perficies contrario operandi modo, quo uti licebit, quando latus tertium quæsitum excedit quadrantem.]

Constitue regulam horizontalem ad æquatoris lineam, & inter parallelos apolo arctico crus alterutrum numera nempe AB 60, *& inter meridianos parallelum hunc secantes fupputa angulum datum A* 30, *idque ab extimo & dextro sinistrorsum; atque communi circulorum intersectioni apice brachioli applicato, numera in limbo dextro ab æquatore versus polum arcticum crus alterum datum AC* 30 *gr. & ad terminum hujus numerationis regula perducatur: isto enim modo index brachioli monstrabit inter parallelos a polo basin BC* 26½, *atque inter meridianos ab extimo et sinistro dextrorsum ostendet angulum C* 103, *qui nempe cruri in limbo numerato adjacet. Unde angulum alterum B colliges inverso operandi ordine, nempe regula constituta*

stituta ad æquatorem numerabis inter parallelos crus AC 50, in quo constituto indice ad angulum A, inter meridianos ut supra numeratum: regulam perduces ad mensuram cruris AB 60 in limbo dextro numeratum, & sic ostendet apex denuo inter parallelos basin anguli dati B C 26½, & inter meridianos ab extimo dextrorsum angulum B desideratum 49½, qui nempe cruri in limbo numerato adjacet eodem modo ut supra.

Tertia ratione idem colligere.

Numera in limbo sinistro a polo arctico crus alterutrum datorum nempe A B 60, & ibidem ducatur regula. Deinde inter parallelos a polo supputa crus alterum AC 50, atque inter meridianos parallelum hunc secantes numera ab extimo & sinistra parte versus dextram angulum comprehensum datum A 30 ad communem circulorum concursum apicem brachioli perducito, postmodū transferatur regula ad meridianum rectum in utrumque scilicet polum: Isto enim modo habebis inter parallelos a polo arctico usque ad apicem brachioli basin anguli dati B C 26½,

&

& inter meridianos ab extimo & dextro sinistrorsum indicatur angulus B $59\frac{1}{2}$, *qui nempe lateri in limbo numerato idjacet. Quare si velis angulum* C, *pro crure* AB *in limbi grad. numerato numerabis crus* AC. *regulam ibidem ducendo, &c.*

Quarta ratione & per inversionem antecedentis idem problema absolvere.

Constitue horizontalem regulam ad meridianum rectum in utrumque polum, atque inter parallelos a polo arctico numera crus alterutrum scilicet AB 60. *& inter meridianos ab extimo & dextro angulum datum* A 30 gr. *ad concursum numerorum apicem styli diligenter admove: His peractis numera in limbo sinistro ab eodem polo crus alterum datum* AC 50, *& ibidem transferatur regula: Sic enim apex styli ostendet inter parallelos a polo basin* BC $26\frac{1}{2}$, *& inter meridianos a sinistris & extimo dextrorsum angulum* C 103. *qui cruri in limbo numerato adjacet.*

Pro angulo reliquo B *cognoscendo, permutabis ordinem numerandi, id est, regula in polos deducta, numerabis inter parallelos*

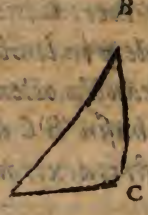
crus

crus AC datum 50, atque inter meridianos ab extimo angulum A 30. Tandem in limbo sinistro latus AB 60, regulaeo deducta, ostendet apex inter parallelos a polo basin BC ut supra, et inter meridianos a sinistris dextrorsum indicat angulum B 59½.

Ex his 4. operandi modis dependet universa Triangulorum Sphæricorum Obliquangulorum resolutio, & sequentia Problemata ex iis deduximus.

Problema 8.

Trianguli obliquanguli Sphærici datis duobus lateribus, & angulo uni eorum opposito: latus tertium, & angulum lateribus datis comprehensum concludere; dummodo constet species ejusdem sitne obtusus vel acutus.



[In triangulo sphærico obliquangulo ABC, dentur latera AB 60, BC 26½. & angulus dato AB lateri oppositus C 103. Tertium latus BC cum angulo datis lateribus comprehenso A. hoc modo venaberis.]

Numera inter parallelos a polo latus angulo dato oppositum AB 60 & paralleli numerati partem dextram observabis quando angulus desideratus et a lateribus datis comprehensus datur acutus: partem vero ejus sinistram notabis quando angulus existit obtusus.

[Per partem autem dextram intellige eam quæ inter meridianum rectum & limbum dextrum includitur, sic partem sinistram appellamus eam quæ inter eundē meridianum rectum & limbum sinistrum intercipitur.

Deinde in limbo dextro ab æquatore versus polum arcticum latus alterum datum BC 26½ numerabis, ac eo ducenda regula. Consequenter inter meridianos a sinistro & extimo dextrorsum supputabis angulum datum C 103 & in meridiano numerato index ponatur, idque ubi fors dederit vel ad æstimatum locum. Eadem regula ad æquatoris situm transferenda, quod si enim tunc index in parallelum notatum inciderit perfecta

erit

erit operatio, sin vero transierit eundem vel necdum eo pervenerit, eadem repetenda operandi forma, hoc est regulam in limbo ad locum priorem reduces, indicem in meridiano suo magis attolles vel deprimes pro ut vel ante vel post parallelum observatum in priore examine ceciderit, idq; bis terve tentandum quousq; nimirum regula in æquatorem translata, apex indicis exacte in parallelum ad partem tamen ejus notatam inciderit: namq; isto modo habebis inter meridianos, numerando ab extimo & dextro usque ad indicis situm, angulum datis cruribus comprehensum B $59\frac{1}{2}$ *grad. nec non & reducendo regulam ad priorem limbi situm, in parallelis a polo usque ad indicis situm numerabis latus tertium* AC 50.

Alio modo & priori conversо idem absolvere.

Constituta regula ad situm æquatoris numerabis inter parallelos a polo arctico latus angulo dato oppositum AB 60, *et paralleli numerati partem dextram notabis quando angulus desideratus* B *datur obtusus, partem vero ejus sinistram quando angulus iste exsi-*

stit acutus ut in nostro exemplo. Deinde inter meridianos ab extimo & dextro sinistrorsum angulum datum C supputato 103. in quo ad æstimatum altiquem locum index ponendus. Consequenter in limbo dextro ab æquatore versus polum arcticum numeretur latus alterum datum BC 26½. atque eo ducenda regula. Quod si in isto regula situ index in parallelum ad partem ejus observatam exacte ceciderit, peracta erit operatio; sin minus, repetenda. Tum enim index ostendet inter meridianos a sinistro dextrorsum ang. cruribus datis comprehensum BC 59½, et reducta regula ad æquatoris situm, ostendet idem index inter parallelos a polo arctico latus tertium incognitum AC 50.

Tertio modo prædictum probl. absolvere dum modo constet latus incognitum sitne quadrante majus an minus.

Numera inter meridianos ab extimo & dextro sinistrorsum amplitudinem ang. dati C 103. meridianus in quem finit numeratio diligenter notetur. Deinde in limbo dextro ab æquinoctiali versus arcticum polum sumpta latus quod ang. dato adjacet BC 26½, ac

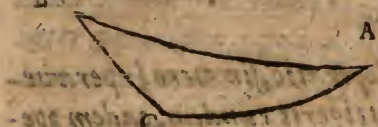
eo ducatur regula. Consequenter inter parallelos a polo eodem numera latus alterum & angulo dato oppositum AB 60, *in hoc parallelo index ad æstimatum locum applicetur. Postmodum regula ad æquatoris lineã transferatur, quod si index tunc inciderit in meridianum notatum ad partem nimirum ejus borealem, quando latus tertium & incognitum datur quadrante minus: vel ad australem ejus partem, quando latus illud existit quadrante majus.*

[Partem borealem appellamus eam quæ est inter polum arcticum & æquatorem intercepta, reliquam partem inter antarcticum polum & æquatorem interjectã vocamus australem.]

Absoluta erit operatio, sin vero superaverit vel necdum attigerit eundem, eadem operandi forma repetenda, iterumque ac tertio tentandum quousque apex styli in meridianum notatum exacte incidat. Namque isto modo index inter parallelos a polo indicabit latus tertium incognitum AC 50: *atque regula ad situm priorem in limbo reducta monstrabit idem index inter meridianos ab extimo & sinistro dextrorsum angulum datis lateribus comprehensum* B $59\frac{1}{2}$.

Problema 9.

In Triangulo Sphærico obliquangulo datis duobus lateribus cum ang. uni eorum opposito; latus tertium & angulum alteri dato lateri oppositum inquirere, dummodo species ejus cognoscatur, sitne obtusus an acutus.



[In triang. Sphæ. rico ABC dentur latus AC 50 & BC 26½ cũ angulo lateri BC dato opposito nempe A 30 gr. Tertium latus A B & angulum B alteri lateri dato oppositum (quem pono esse acutum) hoc modo colliges.]

Constituta regula ad parallelum rectum numerabis inter parallelos a polo arctico latus ang. dato oppositum BC 26½, *& paralleli numerati partem sinistram notabis quando angulus desideratus* B *datur acutus, partem vero dextram quando angulus iste datur obtusus. Consequenter inter eosdem paral-*

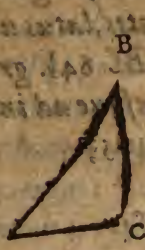
los &

los & ab eodem polo latus alterum datum numerandum, utpote AC 50 angulo dato adjacens, sic quoque & inter meridianos a dextro & extimo sinistrorsum supputa ang. datum A 30, & communi circulorum numeratorum intersectioni stylum applicato. Moveatur tandem regula a dextra parte ⌣ sursum donec apex styli ad parallelum in partem notatam pervenerit, utpote partem sinistram propter ang. desideratum B acutum. Isto enim modo regula ostendet in limbo latus quæsitum tertium AB 60 idque ab æquatoris parte ⌣ dextra numerando: nec non & apex styli ostendet inter meridianos ab extimo & dextro angulum desideratum B 59½ utpote ⌣ alteri lateri dato oppositum.

Aliter.

Numera inter parallelos a polo arctico latus ang. dato oppositum AC 50, & paralleli numerati pars dextra observetur quando ang. desideratus datur acutus, verum si datur is obtusus observanda pars sinistra. Regulam constitue in limbo sinistro ad locum aliquem æstimatum. Deinde inter meridianos ab extimo & sinistro numera ang. datum

trum latus ignotum, angulum alterum datum subtendens, quadrante majus fuerit, an minus.



[In triangulo obliquangulo ABC detur angulus B 10½ gr. & ang. C 154⅓. latus AC subtendens angulum datum B sit datum 23⅓. denique latus angulo altero dato C opposito detur quadrante majus. ex his latera A B & B C hoc modo cognoscēs]

Constituenda regula ad æquatoris situm, & inter meridianos ab extimo & sinistro dextrorsum numerabis ang. B 10½ *gr. qui nempe lateri ex thesi dato opponitur. Meridiani numerati partem borealem notabis quando latus incognitum* AB *angulo noto* C *oppositum datur quadrante minus: verum australis ejus pars notanda quando latus illud quadrātem excedit. Consequenter inter meridianos ab extimo & dextro sinistrorsum angulum alterum datum* C 154⅓ *numerabis, & inter parallelos numera a polo arctico latus datum* AC 23⅓; *& ad communem hujus paralleli & meridiani numerati intersectionem indicem applicato. Postea moveatur regula (quam in-*

dex sequitur) tantisper donec index in meridianum notatum ad partem ejus australē (quia latus AB datur quadrante majus) incidat. Isto enim modo regula ostendet, in gradibus limbi ab æquatore numeratis, latus utrique angulo dato interiectum BC 84½. gr. & inter parallelos a polo arctico usque ad indicem habebis latus tertium AB 105½.

Alio modo idem inquirere.

Numera inter meridianos ab extimo & dextro datum angulum laterique dato oppositum B 10½. gr. Meridianus hic in quem finit numeratio, eodem modo ut supra, ad partem vel dextram vel sinistram observetur. Deinde regulam ad gradum aliquem in limbo dextro æstimatum constitue. Consequenter inter parallelos a polo arctico supputa latus datum AC 23½: & inter meridianos a sinistro & extimo dextrorsum supputa angulum datum C 154½, & communi horum circulorum concursu apicem brachioli adjungito: Traducatur postmodum regula ad æquatoris lineam, quod si tunc apex brachioli inciderit in meridianum observatum ad partem ejus

australē

australem, quia latus AB excedit quadrantem 72
perfecisti operationem; sin verò transcurrerit, vel necdum ad eundem pervenerit, iteranda est operatio, hoc est regula denuo ducenda ad æstimatum limbi gradum, sed propriùs versus polum sive æquatorem, prout index in examine isto ceciderat ante vel post meridianum: atque index constituendus ad situm priorem: tandem ubi, bis terve tentando, index (regula ad æquatorem traducta) meridianum præscriptum exactè attigerit: habebis inter parallelos, ab arctico polo usque ad indicem numeratos, latus AB 105½ quod angulo incognito adjacet.

Porro reducta regula ad situm suum in limbo, ostendet in gradibus ejusdem ab æquatore numeratis latus tertium, quod angulum incognitum subtendit, nempe BC 84½ gr.

Problema II.

In triangulo obliquangulo datis duobus angulis, & latere utriq; eorum adjacente: latera reliqua colligere.

mes, prout æstimatio prior te fefellerit. Naque ubi bis iterve tentando res succesſerit, & regula ad æquatorem deducta, index meridianum notatum exacte attingat: Habebis inter parallelos a polo uſque ad indicem numeratos, latus adjacens angulo prius numerato, nempe AB 60.

Conſequenter reducta regula ad ſitum priorem in limbo, oſtendet index inter parallelos eoſdem a polo itidem numeratos latus tertium BC 20½, quod angulum prima vice numeratum ſubtendit.

Alio modo.

In primis conſtituenda regula ad æquinoctialem, deinde numera inter meridianos a ſiniſtro dextrorſum angulum alterutrum datum, utpote A 30.

Meridianus in quem finit numeratio obſervetur, ſimiliter ſupputa inter meridianos a dextro ſiniſtrorſum angulum alterum datum C 103 grad. & in hoc meridiano indicem ad æſtimatum locum collocato, poſtmodum numera in limbo dextro ab æquatore verſus polum arcticum latus datum AC 50, atque ibidem

ibidem transferatur regula, quod si index ista ratione inciderit in meridianum notatum, ostendet inter parallelos a polo latus B 26½, subtendens angulum A primo loco numeratum.

Consequenter reducta regula ad æquinoctialem monstrabit idem index inter parallelos a polo latus tertium AB 60 subtendens angulum C postrema vice numeratum, sin vero index in notatum meridianum non exacte inciderit, repetenda est eadem operandi ratio ista cautione qua in superiori demonstravimus.

Problema 12.

Trianguli obliquanguli datis lateribus: tres angulos ejusdem concludere.

Numera in gradibus limbi dextri ab æquatore versus polum latus alterutrũ datũ. verbi gratia, in præscripto A B C triangulo numera latus AB 60 & ibidem ducatur regula:

gula: Deinde inter parallelos a polo reliqua duo latera singulatim supputato, quorum ad alterutrum indicem loco æstimato adjunges, & alterum caute observabis, verbi gratia, indicem adjunge ad parallelum lateris BC $26\frac{1}{2}$, & alterum parallelum utpote lateris AC 50. notato.

Consequenter regulam ad æquinoctialem transferto, quod si tunc index in observatum parallelum inciderit, in operatione ista nihil amplius desiderabitur, sin minus eadem operandi forma repetenda, hoc est, regula ad situm suum in limbo deducta, indicem in parallelo suo (nempe ad $26\frac{1}{2}$) magis sinistrorsum sive dextrorsum movebis, donec nimirum regula ad æquatorem traducta, index parallelii observatum exacte attingat, hoc enim quando fit, monstrabit index inter meridianos ab extimo et dextro sinistrorsum angulum, qui lateri pro situ indicis inter parallelos numerato opponitur, nempe angulum A 30.

Consequenter regula ad priorem situm in limbo traducta, ostendet idem index inter meridianos a sinistro dextrorsum angulum B $59\frac{1}{2}$, qui lateri ad observatum parallelum opponitur.

Porro

det index inter meridianos, a sinistro dextrorsum angulum A 30, qui opponitur lateri inter parallelos ad situm indicis numerato.

Porro reducta regula ad æquatoris situm monstrabit index inter meridianos a dextro sinistrorsum angulum B 59½ qui opponitur lateri paralleli notati.

Tertio modo idem perficere.

Constitue regulam in utrumque polum ad meridianum rectum, & inter parallelos a polo arctico numera ut pridem datorum latera duo, quorum ad alterutrum loco quocunque æstimato indicem adjungito, alterum diligenter observato. Deinde in sinistra limbi parte a polo arctico incipiendo numera latus tertium datum, & eo transferatur regula: quod si tunc index in parallelum observatum inciderit, peracta erit operatio, & in isto situ ostendet inter meridianos a sinistro dextrorsum amplitudinem anguli istius, qui opponitur lateri pro indicis situ inter parallelos numerato.

Deinde

Deinde regula ad utrumq; polum restituta, monstrabit idem index a dextro meridiano usque ad situm suum angulum oppositum altero lateri inter parallelos numerato: Namque angulus qui lateri in limbo numerato opponitur inter operandum non succurrit.

Problema 13.

Trianguli obliquanguli datis tribus angulis tria ejusdem latera concludere.

In triangulo obliquangulo A B C dentur tres anguli in eadem quantitate qua pridem utpote angulus A sit 30, Angulus B 59½. Angulus C 103, quæranturque tria latera.

Constitues regulam horizontalem ad æquatorem, & inter parallelos a polo numerabis angulum utrumque minimum, utpote angulum A 30, & angulus B 59½, quorum ad alterutrum nempe A 30 indicem pro situ æstimato jungito, alterum nempe B 50 caute notato: Deinde supputabis inter limbi gradus incipien-

incipiendo ab æquatoris sinistra parte per polum arcticum angulum datorum maximum utpote 103, & ad gradum istum numeratum dextra regulæ horizontis pars transferatur: Quod si tunc index in parallelum observatum inciderit erit absoluta operatio: sin minus repetenda tanti per, donec nimirum index observatum parallelum exacte attingat: Tunc enim index inter meridianos a sinistro dextrorsum indicabit latus BC 20½, quod nempe angulum pro situ indicis inter parallelos numeratum subtendit.

Porro restituta regula ad æquatorem monstrabit index inter meridianos a dextro sinistrorsum latus AC, subtendens angulum paralleli observati.

Alio modo.

Constitue regulam horizontalem ad meridianum rectum, sic ut latus ejus respiciat limbum dextrum, & inter parallelos a polo arctico numera angulum minimum, quorum ad alterutrum pro situ æstimato indicem adjungito, alterum caute observato: Deinde in gradibus limbi dextri ab eodem polo deorsum numerabis angulum tertium datum, atque

eo duces regulæ partem dextram. Quod si tunc index inciderit in parallelū notatum, ostendet inter meridianos a sinistro dextrorsum latus quod subtendit angulum pro situ indicis inter parallelos numeratum: nec non restituta regula ad situm meridiani recti, monstrabit idem index inter meridianos a dextro sinistrorsum latus subtendens angulū paralleli observati.

Pleraque obliquangulorum problemata licebit aliis modis solvere per inquisitionem arcus perpendicularis à vertice trianguli in subjectam basin demissi, qui propositum obliquangulum triangulum in duo rectāgula dislocat & resolvit. Vnde cognita rectang. Triang. solutione, non ignorabitur solutio obliquang. Consule part. 3. hujus de obliquang. Triang. ad princip.

Diatyposis Problematum in qua datorum inventio oculis subjicitur.

De Resolutione Triangulorum Rectangulorum sphæricorum.

Solvi-

Solvitur Triangulum rectang.

E Datis.

1. Basi & angulo alterutro acuto.
2. Basi & crure alterutro.
3. Crure & angulo eidem adjacente acuto.
4. Crure & angulo acuto eidem opposito.
5. Vtroque crure anguli recti.
6. Vtroque angulo acuto.

De Resolutione Obliquangulorum Triangul.

Solvitur Triangulum Obliquangulū.

E Datis.

7. Duobus lateribus & angulo ab eis comprehenso.
8. & 9. Duobus lateribus & angulo uni eorum opposito.
10. Duobus angulis & latere uni eorū opposito.
11. Duobus angulis & latere utriq; interjacente.
12. Tribus lateribus.
13. Tribus angulis.

TRACTATVS

TRIGONOMETRIAE ASTRONOMICAE

Pars tertia, quę est de resolutione Triangulorum Sphæricorum per Canonem Triangulorum.

Obiter ex classicis tam veteribus, quam recentioribus autoribus desumpta; & in expeditissimum calculum reducta.

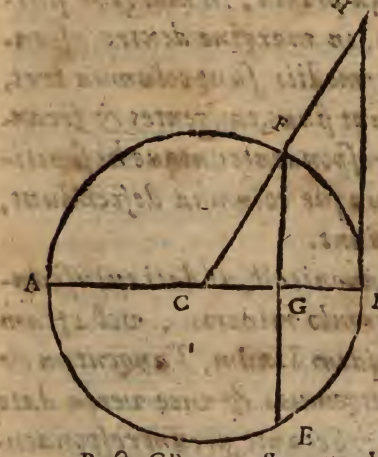
1. *Canon triangulorum omnium, & singularum trianguli cujusvis partium certam & numeris explicatam determinatamve inter sese proportionem exhibet.*

2. *Ergo Canonis hujus adminiculo per auream Arith. proportionum regulam* (quæ datis tribus quibuscunque, ex quatuor numeris inter se proportionalibus, quartum invenire nos facit) *omnis Triangulorum solutio perficietur.*

3. *Canon triangulorum est, quæ in assumpta peripheriæ & semidiametri mensura omnium semiperipheriæ arcuum in gradus & minu-*

ta distributorum, Sinus, Tangentes & Secantes continet.

[Veteres solis subtensis utebantur, ac proinde Canonem Triangulorum appeliabant eum, qui semicirculi partiũ solas subtensas continebat. Subtensæ autem sunt lineæ peripheriæ inscriptæ, quarum semisses sunt ipsi sinus: Iam vero cum plenior planiorq; sit Geometria, etiam eas consideramus lineas, quę sunt extra, & per circuli peripheriam, utpote Tangentes & Secantes; & de eis tabulæ construuntur, ex quibus magnitudines linearum Sinuum, Tangentium & Secantium cujuslvis semipheriæ arcus in gradus & minuta distributi cognoscimus, idque in partibus qualium semidiameter radius dicta 100000. De quibus inspicito subjectum schema.



In schemate recta AB est diameter peripheriæ descriptæ. Hujus semisis & semidiameter CB dicitur Radius, Recta FE peripheriæ inscripta subtendit arcũ FBE. Hujus semisis FG, quæ est a termino ejusdem arcus in radium perpendicularis est Sinus semisis prædicti FBE arcus, utpote arcus FG, vel etiam complementi eius ad semicirculũ, utpote arcus AF.

Recta GB, quæ est portio diametri inter arcum & subtensam interjecta, est sinus versus ejusdẽ FB arcus.

Recta GA quæ est reliqua diametri pars, est Sinus versus arcus AF. Complementi scilicet FB arcus ad semicirculum.

Recta BH quæ est extra peripheriam, eamque in extremum radii perpendiculari iter tangit: est tangens arcus BF, vel complementi ejus ad semicirculum, utpote AF.

Recta CH a centro C per arcus terminum F in tangentē continuata, dicitur Secans arcus BF, vel AF complementi ejusdem.]

4. *Dispositio hujus canonis aliis alia placuit, nobis commodissima ea visa, quam ex Barth. Pitisco huc transtulimus: in qua (ut videre est) in primo & postremo paginæ cujuscunque loco sunt arcus quadrantis, per gradus et minuta sive scrupula prima, in margine sinistro descendentes, in margine dextro ascendentes: locis intermediis sunt columnæ tres, quæ comprehendunt sinus, tangentes & secantes arcubus illis respondentes: atque hi similiter in sinistra quaque columna descendunt, in dextra ascendunt.*

5. *Usus hujus canonis est, ut dati cujuscunque arcus semicirculo minoris, vel etiam complementi ejusdem Sinum, Tangentem & Secantem investigemus: & vice versa dato Sinu, Tangente & Secante, arcum respondentem colligamus. Quorū investigandorum illud fit per lateralem tabulæ ingressum, hoc vero per arealem.*

6. Late-

6. *Lateralis tabulæ ingressus est quo cujuscunq; propositi, vel etiam complementi arcus sinum, Tangentem & Secantem excerpimus, idque in hunc modum.*

Intrabis congruam ipsius tabulæ paginã, quærendo gradus, & minuta gr. in sinistro margine descendendo, si arcus propositus fuerit minor quam 45 grad. Contra in dextro latere ascendendo, si propositus arcus 45 excesserit: quibus repertis offendes ibidem in propria quavis columna Sinum, Tangentem & Secantem, tum arcus tui propositi, tum complementi ejusdem ad quadrantem.

Exempli gratia.

[Proponitur arcus 20 gr. 13 m. cujus sinum tangentem & Secantem vis cognoscere, intrabis ipsius tabulæ paginam congruentem lateraliter, ubi in latere sinistro ad verticem sese offerunt gradus 20, in descensu ejusdem lateris quærito 13 minuta. Et ibidem communes columnas perspicito, offendes ad sinistras earum partes Sinum 34557. Tangentem 36826. Secantem 106565. respondentes arcui proposito 20 gr. 13 m. Consequenter ad dextras columnarum partes, reperies ibidem Sinum 93839. Tang. 271548. Secant. 289376. qui respondent arcus propositi complemento ad quadrantem, nempe arcui 69 gr. 47′ in ejusdem paginæ margine dextro inter minuta ascendentia oxpresso.

Quod si detur arcus quadrante major velisque ejus sinum Tang. & Secantem, auferes propositum arcum a semicirculo & cum residuo isto tabulam ad eundem modum lateraliter intrabis.]

ibidem transferatur regula, quod si index ista ratione inciderit in meridianum notatum, ostendet inter parallelos a polo latus B 26½, subtendens angulum A primo loco numeratum.

Consequenter reducta regula ad æquinoctialem monstrabit idem index inter parallelos a polo latus tertium AB 60 subtendens angulum C postrema vice numeratum, sin vero index in notatum meridianum non exacte inciderit, repetenda est eadem operandi ratio ista cautione qua in superiori demonstravimus.

Problema 12.

Trianguli obliquanguli datis lateribus: tres angulos ejusdem concludere.

Numera in gradibus limbi dextri ab æquatore versus polum latus alterutrũ datũ. verbi gratia, in præscripto A B C triangulo numera latus AB 60 & ibidem ducatur regula:

gula: Deinde inter parallelos a polo reliqua duo latera singulatim supputato, quorum ad alterutrum indicem loco æstimato adjunges, & alterum caute observabis; verbi gratia, indicem adjunge ad parallelum lateris BC $26\frac{1}{2}$, & alterum parallelum utpote lateris AC 50. notato.

Consequenter regulam ad æquinoctialem transferto, quod si tunc index in observatum parallelum inciderit, in operatione ista nihil amplius desiderabitur, sin minus eadem operandi forma repetenda, hoc est, regula ad situm suum in limbo deducta, indicem in parallelo suo (nempe ad $26\frac{1}{2}$) magis sinistrorsum sive dextrorsum movebis, donec nimirum regula ad æquatorem traducta, index parallelu observatum exacte attingat, hoc enim quando fit, monstrabit index inter meridianos ab extimo et dextro sinistrorsum angulum, qui lateri pro situ indicis inter parallelos numerato opponitur, nempe angulum A 30.

Consequenter regula ad priorem situm in limbo traducta, ostendet idem index inter meridianos a sinistro dextrorsum angulum B $59\frac{1}{2}$, qui lateri ad observatum parallelum opponitur.

Porro

det index inter meridianos, a sinistro dextrorsum angulum A 30, qui opponitur lateri inter parallelos ad situm indicis numerato.

Porro reducta regula ad æquatoris situm monstrabit index inter meridianos a dextro sinistrorsum angulum B 59½ qui opponitur lateri paralleli notati.

Tertio modo idem perficere.

Constitue regulam in utrumque polum ad meridianum rectum, & inter parallelos a polo arctico numera ut pridem datorum latera duo, quorum ad alterutrum loco quocunque æstimato indicem adjungito, alterum diligenter observato. Deinde in sinistra limbi parte a polo arctico incipiendo numera latus tertium datum, & eo transferatur regula: quod si tunc index in parallelum observatum inciderit, peracta erit operatio, & in isto situ ostendet inter meridianos a sinistro dextrorsum amplitudinem anguli istius, qui opponitur lateri pro indicis situ inter parallelos numerato:

Deinde

incipiendo ab æquatoris sinistra parte per polum arcticum angulum datorum maximum utpote 103, & ad gradum istum numeratum dextra regulæ horizontis pars transferatur: Quod si tunc index in parallelum observatum inciderit erit absoluta operatio: sin minus repetenda tanti sper, donec nimirum index observatum parallelum exacte attingat: Tunc enim index inter meridianos a sinistro dextrorsum indicabit latus BC 20½, quod nempe angulum pro situ indicis inter parallelos numeratum subtendit.

Porro restituta regula ad æquatorem monstrabit index inter meridianos a dextro sinistrorsum latus AC, subtendens angulum paralleli observati.

Alio modo.

Constitue regulam horizontalem ad meridianum rectum, sic ut latus ejus respiciat limbum dextrum, & inter parallelos a polo arctico numera angulum minimum, quorum ad alterutrum pro situ æstimato indicem adjungito, alterum caute observato: Deinde in gradibus limbi dextri ab eodem polo deorsum numerabis angulum tertium datum, atque

eo duces regulæ partem dextram. Quod si tunc index inciderit in parallelū notatum, ostendet inter meridianos a sinistro dextrorsum latus quod subtendit angulum pro situ indicis inter parallelos numeratum: nec non restituta regula ad situm meridiani recti, monstrabit idem index inter meridianos a dextro sinistrorsum latus subtendens angulū paralleli observati.

Pleraque obliquangulorum problemata licebit aliis modis solvere per inquisitionem arcus perpendicularis à vertice trianguli in subjectam basin demissi, qui propositum obliquangulum triangulum in duo rectāgula dislocat & resolvit. Vnde cognita rectang. Triang. solutione, non ignorabitur solutio obliquang. Consule part. 3. hujus de obliquang. Triang. ad princip.

Diatyposis Problematum in qua datorum inventio oculis subjicitur.

De Resolutione Triangulorum Rectangulorum Sphæricorum.

Solvi-

Solvitur Triangulum rectang.

E Datis.

1. Basi & angulo alterutro acuto.
2. Basi & crure alterutro.
3. Crure & angulo eidem adjacente acuto.
4. Crure & angulo acuto eidem opposito.
5. Vtroque crure anguli recti.
6. Vtroque angulo acuto.

De Resolutione Obliquangulorum Triangul.

Solvitur Triangulum Obliquangulũ.

E Datis.

7. Duobus lateribus & angulo ab eis comprehenso.
8. & 9. Duobus lateribus & angulo uni eorum opposito.
10. Duobus angulis & latere uni eorũ opposito.
11. Duobus angulis & latere utriq; interjacente.
12. Tribus lateribus.
13. Tribus angulis.

TRACTATVS

TRIGONOMETRIAE ASTRONOMICAE

Pars tertia, quę est de resolutione Triangulorum Sphæricorum per Canonem Triangulorum.

Obiter ex classicis tam veteribus, quam recentioribus autoribus desumpta; & in expeditissimum calculum reducta.

1. *Canon triangulorum omnium, & singularum trianguli cujusvis partium certam & numeris explicatam determinatamve inter sese proportionem exhibet.*

2. *Ergo Canonis hujus adminiculo per auream Arith. proportionum regulam* (quæ datis tribus quibuscunque, ex quatuor numeris inter se proportionalibus, quartum invenire nos facit) *omnis Triangulorum solutio perficietur.*

3. *Canon triangulorum est, quæ in assumpta peripheriæ & semidiametri mensura omnium semiperipheriæ arcuum in gradus & minu-*

ta distributorum, Sinus, Tangentes & Secantes continet.

[Veteres solis subtensis utebantur, ac proinde Canonem Triangulorum appeliabant eum, qui semicirculi partiũ solas subtensas continebat. Subtensæ autem sunt lineæ peripheriæ inscriptæ, quarum semisses sunt ipli sinus: Iam vero cum plenior planiorq; sit Geometria, etiam eas consideramus lineas, quę sunt extra, & per circuli peripheriam, utpote Tangentes & Secantes; & de eis tabulæ constituuntur, ex quibus magnitudines linearum Sinuum, Tangentium & Secantium cujuivis semipheriæ arcus in gradus & minuta distributi cognoscimus, idque in partibus qualium semidiameter radius dicta 100000. De quibus inspicito subjectum schema.

In schemate recta AB est diameter peripheriæ descriptæ. Hujus semisis & semidiameter CB dicitur Radius. Recta FE peripheriæ inscripta subtendit arcũ FBE. Hujus semisis FG, quæ est a termino ejusdem arcus in radium perpendicularis est Sinus semisis prædicti FBE arcus, utpote arcus FG, vel etiam complementi eius ad semicirculũ, utpote arcus AF.

Recta GB, quæ est portio diametri inter arcum & subtensam interjecta, est sinus versus ejusdẽ FB arcus.

Recta GA quæ est reliqua diametri pars, est Sinus versus arcus AF. Complementi scilicet FB arcus ad semicirculum.

Recta BH quæ est extra peripheriam, eamque in extremum radii perpendiculariter tangit: est tangens arcus BF, vel complementi ejus ad semicirculum, utpote AF.

Recta CH a centro C per arcus terminum F in tangentē continuata, dicitur Secans arcus BF, vel AF complementi ejusdem.]

4. *Dispositio hujus canonis aliis alia placuit, nobis commodissima ea visa, quam ex Barth. Pitisco huc transtulimus: in qua (ut videre est) in primo & postremo paginæ cujuscunque loco sunt arcus quadrantis, per gradus et minuta sive scrupula prima, in margine sinistro descendentes, in margine dextro ascendentes: locis intermediis sunt columnæ tres, quæ comprehendunt sinus, tangentes & secantes arcubus illis respondentes: atque hi similiter in sinistra quaque columna descendunt, in dextra ascendunt.*

5. *Usus hujus canonis est, ut dati cujuscunque arcus semicirculo minoris, vel etiam complementi ejusdem Sinum, Tangentem & Secantem investigemus: & vice versa dato Sinu, Tangente & Secante, arcum respondentem colligamus. Quorū investigandorum illud fit per lateralem tabulæ ingressum, hoc vero per arealem.*

6. *Late-*

6. *Lateralis tabulæ ingressus est quo cujuscunq; propositi, vel etiam complementi arcus sinum, Tangentem & Secantem excerpimus, idque in hunc modum.*

Intrabis congruam ipsius tabulæ paginã, quærendo gradus, & minuta gr. in sinistro margine descendendo, si arcus propositus fuerit minor quam 45 grad. Contra in dextro latere ascendendo, si propositus arcus 45 excesserit: quibus repertis offendes ibidem in propria quavis columna Sinum, Tangentem & Secantem, tum arcus tui propositi, tum complementi ejusdem ad quadrantem.

Exempli gratia.

[Proponitur arcus 20 gr. 13 m. cujus sinum tangentem & Secantem vis cognoscere, intrabis ipsius tabulæ paginam congruentem lateraliter, ubi in latere sinistro ad verticem sese offerunt gradus 20; in descensu ejusdem lateris quærito 13 minuta. Et ibidem communes columnas perspicito, offendes ad sinistras earum partes Sinum 34557. Tangentem 36826. Secantem 106565. respondentes arcui proposito 20 gr. 13 m. Consequenter ad dextras columnarum partes, reperies ibidem Sinum 93839. Tang. 271548. Secant. 289276. qui respondent arcui propositi complemento ad quadrantem, nempe arcui 69 gr. 47′ in ejusdem paginæ margine dextro inter minuta ascendentia expresso.

Quod si detur arcus quadrante major velisque ejus sinum Tang. & Secantem, auferes propositum arcum a semicirculo & cum residuo isto tabulam ad eundem modum lateraliter intrabis.]

7. *Arealis tabulæ ingressus est, quo oblato sinu, Tangente, vel Secante, ejus respondentem arcum vel complementi arcum ad quadrantem excerpimus.*

Intramus enim tabulam areatim, propositum sinum, tangentem, vel secantem inter areales columnarum numeros investigando. Namque graduum & minutorum numeri, qui ad latera convenientia sese offerunt, desideratum arcum exprimunt.

[Verbi gratia, esto Sinus 27842 cujus arcum libeat cognoscere. Investigabis hunc sinum inter areales numeros in Columna Sinuum, donec eam invenias, qui sese in sinistrâ columnæ partem offert, & ibidem in sinistro quoque margine respondet ipsi arcus 16 gr 10'. in dextro margine habetur arcus 73 gr. 50. m. estque complementum ejusdem arcus.

Quod si datus & propositus Sinus præcise non reperiatur, accipiendus erit is tabulæ sinus, quem proprius ad ipsum tabulæ sinum accedere videbis & illius examinandus arcus. Idem quoque de Tangentibus Secantibus intelligendum.

Nonnulli tamen cui iosius hæc rimantur, & per partem proportionalem verum sinum, tangent. & secant. eliciunt, quando proposito quoque arcui præter gradus & scrupula prima adsunt secunda.]

8. *Cognitio sinus versus interdum in resolutione triangulorum usum habet, ejusque inquisitio per tabulam sinuum est facilis.*

Si enim propositus arcus fuerit quadrante minor,

minor, tunc dempto sinu complementi arcus e radio, relinquitur sinus versus arcus dati.

[Verbi gratia sit quærendus sinus versus arcus dati 20 gr. 13 m. accipiatur hujus complem. sinus utpote 93839 qui de radio 100000 subtactus, relinquitur pro sinu verso quæsito 6161.]

9. *Si vero datus arcus fuerit quadrante major, tunc sinu excessus arcus dati super circuli quadrantem ad radium adjecto, componitur sinus versus arcus dati quadrante majoris.*

[Exempli gratia si quæratur sinus versus arcus 110 gr. 13' hujus excessus super circuli quadrantem est 20 grad. 13'. Cujus sinus nempe 34557 ad radium adjectus, componit sinum vers. desideratum 134557.]

10. *Vice versa si datus sit sinus versus, velisque ejus respondentem arcum: tunc si propositus numerus fuerit minor radio, indicio est quod arcus respondens minor quoque sit quadrante: auferes itaque sinum versum propositum e radio, relinquetur Sinus arcus complementi quæsiti.*

[Verbi gratia, si datus sit sinus versus 6161 detrahemus eum ex radio 100000, & cum reliquo 93839 tanquam sinu recto expiscabimur arcum respondentem, utpote 69 gr. 47' cujus complementum 20 gr. 13 m. est ipsum quæsitum.]

11. *Si vero propositus numerus excesserit radium, indicio est quod arcus quæsitus sit*

major quadrante, auferesque ab ipso numero radium, relinquitur sinus arcus, qui quadranti adjectus constituit arcum quæsitum.

[Exempli gratia, proponatur sinus versus 134557 detrahemus ab eo radium 100000, & cum reliquo sinu 34557 indagabimus arcum respondentem 20 gr. 13 m. qui adjectus ad quadrantem conficiet arcum quæsitum 110 gr. 13 m.]

12. *Subtensa alicujus arcus interdum quoque inquirenda, eamque cognosces quando sinum dimidii arcus propositi duplicaveris.*

[Verbi gratia. Quæratur subtensa arcus 40 gr. 26 m. hujus arcus dimidium est 20 gr. 13 ejusdemque sinus exsistit 34557, qui duplicatus dabit arcus propositi subtensam 69114.]

Hactenus de Canone triangulorum per cujus usum omnium & singularum cujusvis trianguli partium proportionem, in sinuum, tangentium, & secantium numeris determinatam, exhiberi diximus. Nunc ea ipsa resolutio tam planorum quam sphæricorum triangulorum sequitur. Quæ utraq; per solam Arithmetices auream proportionum regulam absolvitur, dummodo sciatur quę proportiones quibus triangulis & triangulorum partibus insunt. Quod ipsum in triangulis rectangulis per diatyposin subsequentem oculis subjicitur, in qua ob promptitudinem calculi, & ad divisionis molestiam evitandam, proportiones partium trianguli ita disposuimus, ut Radius 100000 ubiq; primum locum in regula aurea habeat. Sic enim in triangulis

gulis rectangulis, quibuslibet duobus præter angulum rectum datis, unum quodque postulatum, unica saltem operatione, per solam nimirum multiplicationem, investigari queat.

Inveniri autem debent in triangulo rectangulo aut basis *anguli recti, aut* crus *ejus alterutrum, aut* angulus acutus *quivis. Quorum posteriora duo postulata ex sex datorum varietatibus, & primum quidem postulatum ex diversitatibus datorum quatuor pervestigantur.*

DIATYPOSIS SEQUITUR.

Postulatum 1. de inquisitione Cruris anguli recti.

CRVS.

Problema 1.

1. Ex data basi angul. recti & angulo qui cruri quæsito opponitur. *Erit enim*

VT Radius	AD Sinum basis	ITA sinus *ang. dati.*	AD Sinum *crur. quæs.*
VT Radius	AD Secantem *compl. basis.*	ITA secans *compl. ang. dati.*	AD Secant. *compl crur. quæsiti.*

Problema

Problema 2.

2. Ex data basi, & angulo qui cruri quæsito adjacet. *Erit enim*

VT Radius AD sinum *compl. ang. dati.* ITA tang. *basis.* AD tang. *lat. quæs.*

VT Radius AD secantem *ang. dati.* ITA tang. *compl. basis.* AD tang. *compl. crur. quæsiti.*

Problema 3.

3. Ex basi data, & crure altero.

VT Radius AD secantem *crur. dati.* ITA sinus *cõpl. basis.* AD sinũ *cõpl. crur. quæs.*

VT Radius AD secantem *basis.* ITA sinus *cõpl. crur. dat.* AD secantem *crur. quæs.*

Problema 4.

4. Ex crure altero, & angulo qui cruri quæsito adjacet. *Erit enim*

VT Radius AD tang. *compl. ang. dati.* ITA tang. *crur. dati.* AD Sinum *crur. quæs.*

VT Radius AD tang. *compl. crur. dati.* ITA tang. *ang. dati.* AD Secant. *compl. crur. quæsiti.*

Problema 5.

5. Ex crure altero, & angulo qui quæsito cruri opponitur. *Erit enim*

VT

VT Radius	AD sinum *crur. dati.*	ITA tang. *ang. dati.*	AD tang *crur. quæsiti.*
VT Radius	AD secantem *cõpl. crur. dati.*	ITA tang. *cõp. ang. dati.*	AD tang. *comp. crur. quæs.*

Problema 6.

6. Ex utroque angulo acuto dato.

VT Radius	AD secantem *compl. ang. adjac. cruri quæs.*	ITA sinus *compl. ang. relig. dati.*	AD sinum *compl. crur. quæs.*
VT Radius	AD secantem *ang. oppositi crur. quæs.*	ITA sinus *ang adjacẽt. crur. quæs.*	AD secantem *crur. quæs.*

Postulatum 2. de basi Anguli recti inquirenda.

BASIS.

Problema 7.

7. Ex dato crure alterutro cum angulo ei adjacente.

VT Radius	AD sinum *compl. ang. dati.*	ITA tang. *compl. dati cruris.*	AD tang. *compl. basis quæs.*
VT Radius	AD secantem *ang. dati.*	ITA tang. *dati crur.*	AD tang. *basis quæs.*

Probl.

Problema 8.

8. Ex dato crure alterutro cum angulo cruri opposito.

VT Radius AD secantem ITA sinus AD sinum
compl. ang. dati. crur. dati. basis quæs.
VT Radius AD sinum ITA secans AD secant.
ang dati. compl. crur. compl. basis.

Problema 9.

9. Ex utroque crure dato.

VT Radius AD secantem ITA secans AD secantē
crur. alterutrius. crur. reliqui. basis.
VT Radius AD sinum cōpl. ITA sinus cōp. AD sinum
crur. alt. reliqui crur. compl. basis.

Problema 10.

10. Ex utroque angulo acuto dato.

VT Radius AD tang. ITA tang. AD secantem
ang. alt. ang. reliqui. basis.
VT Radius AD tang. cōp. ITA tang cōp. AD sinum
ang. alterut. ang. reliqui. compl. basis.

Postulatum 3 de angulo alterutro acuto cognoscendo.

ANGVLVS.

Problema 11.

11. Ex baſe & crure quod angulo quæſito opponitur.

VT radius	AD ſinum *baſis.*	ITA ſecans *cõpl.crur.dati.*	AD ſecantem *cõp.ang.quæſ.*
VT radius	AD ſinum *crur.dati.*	ITA ſecans *compl.baſis.*	AD ſinum *ang.quæſ.*

Problema 12.

12. Ex baſe & crure quod angulo quæſito adjacet.

VT radius	AD tang. *compl.baſis.*	ITA tang. *crur.dati.*	AD ſinum *cõpl.ang.quæſ.*
VT radius	AD tang. *baſis.*	ITA tang. *cõp.crur.dat.*	AD ſecant.*ang. quæſ.*

Problema 13.

13. Ex baſe & altero angulo.

VT radius	AD ſinum *compl.baſis.*	ITA tang. *ang.dati.*	AD tang.*cõpl. ang.quæſ.*
VT radius	AD ſecantem *baſis.*	ITA tang. *cõpl.ang.dati.*	AD tang. *ang.quæſ.*

Problema 14.

14. Ex utroque crure ang. recti.

VT

VT Radius	*AD* sinum *crur. adjacentis ang. quæsito.*	ITA tang. *compl. alter. cruru.*	*AD* tang. *compl. ang. quæs.*
VT Radius	*AD* secantem *comp. crur. ang. quæs. adjacent.*	ITA tang. *alterius cruris.*	*AD* tang. *ang. quæs.*

Problema 15.

15. Ex crure quod angulo quæsito opponitur, & altero angulo.

VT Radius	*AD* sinum *ang. dati.*	ITA sinus *cõpl. crur. dati.*	*AD* sinum *cõpl. ang. quæs.*
VT Radius	*AD* secantem *cõpl. ang. dati.*	ITA secans *crur.*	*AD* secantem *ang. quæs.*

Problema 16.

16. Ex crure ang. quæsito adjacente, & angulo altero.

VT Radius	*AD* secantem *cruris.*	ITA sinus *cõpl. ang. dati.*	*AD* sinum *ang. quæs.*
VT Radius	*AD* secantem *ang. dati.*	ITA sinus *cõpl. crur. dati.*	*AD* secantem *cõp ang. quæs.*

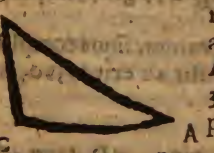
Ex hac constituta diatyposi Triangula Sphærica rectangula per solam multiplicationem solvuntur, siquidem in aurea proportionis regula radius 100000 *semper primo loco constituitur. Vbi tamen non ignorandum nos nic*

nos hic intelligere ista rum tantum triang. solutionem, quæ præter unicum rectum duos habent angulos acutos, quorum proinde latera sunt singulatim quadrante minora.

Namque de reliquis rectangulorum generibus quid statuendum in principio 2. p. hujus monuimus.

Porro placuit hic in gratiam Tironum unicum vel duo solutionis exempla ob oculos ponere, quibus reliquorum solutiones facillime intelligantur.

Primum solutionis exemplum.



[In triangulo sphærico ABC rectangulo ad C quæratur crus ang. recti BC, idque ex data basi AB 60 gr. cum angulo A 23 grad. 31 m. qui nempe cruri quæsito opponitur.

Ex tabula sinuum invenitur quod qualium radius est 100000, earum sinus datæ basis AB 60 grad. erit 86603 & sinus anguli dati A 23 gr. 31 m. erit earundem 39901.

Hinc per primum probl. hujus diatyposis investigabitur ex aurea proportionis regula latus BC hoc modo argumentando.

UT Radius *AD*	sin. *basis.* AB	ITA sin. *ang.* A	*AD* sin *trian.* BC desiderati.
100000	86603	39901	

Operare igitur juxta auream proportionis regulam, secundum nimirum numerum per tertium multiplican-

do, & productum inde numerum in primum hoc est 100000 dividendo.

Constabit sinus quæsiti cruris BC 34555 cui sinui respondet in tabulis Sin. arcus 20 gr. 13' fere. unde crus BC quæsitum erit 20 gr. 13 m.

Alio modo.

Per alteram probl. ejusdem proportionem erit.

VT Radius,	AD secant.	ITA secans	AD secantem
	cõpl. basis. AB	cõpl. ang. A	cõpl. quæs. crur. BC
100000	115470	250617	289387

Atque secanti 289387 respondet arcus compl. 20 grad. 13 min. ut supra.

Secundum solutionis exemplum.

In prædicto triang. quæratur idem crus BC, idque ex data basi AB ut supra 60, & ang. B 77 gr. 43, utpote qui quæsito cruri adjacet.

Qualium Radius 100000 earum, sinus compl. ang. B erit 21275, tangens quoque basis AB erit 173205, unde per 2 probl. erit.

VT Radius,	AD sin. cõpl. ang. B	ITA tang.	AD tang. compl. basis AB	crur. BC quæs.
100000	21275	173205		36849

Arcus compl. respondens est 20 gr. 13 m fere ut supra.

Per secundam probl. proportionem erit.

VT Radius,	AD secant.	ITA tang.	AD tang. compl.
	ang. B	cõpl. bas. AB	crur. quæs. BC
100000	470043	57735	

Cui respondet arcus ut supra.

HAC-

Hactenus de ⌣ rectangulis, sequitur Solutio triangulorum sphæricorum obliquangulorum.

Solutio triangulorum obliquangulorum perficitur, vel

Per reductionem ad rectangula, vel sine ⌣ reductione.

[Triangula obliquangula reducuntur ad rectangula per demissionem arcus perpendicularis a vertice trianguli in oppositam & subjectam basin, atque arcus iste perpendicularis aut cadit intra, aut extra triangulum, ad partem nempe basis continuatam, dislocans triangulum obliquangulum in duo rectangula. Vnde nota & percepta rectangulorum solutione non ignorabitur solutio obliquangulorum.

Quando autem perpendiculum intra quando extra triangulū cadat docet 8 p. 4 Regiomont. quæ tales est.]

Si quis triangulus sphæralis duos acutos habeat angulos, aut duos obtusos; arcus egrediens a vertice tertii anguli, lateri se respicienti occursurus perpendiculariter, intra triangulum reperietur. Si vero alter eorum acutus, & reliquus obtusus exstiterit, extra triangulum necessario cadet.

In triangulis obliquangulis quæ per reductionem ad rectangula solvuntur datorum varietates sunt quatuor.

Ex angulo alterutro dato (puta B) descendat ad basin (contra quam si opus sit) arcus perpendicularis CD (qui an intra an extra triangulum datum cadat, operatio ipsa docebit) illud illo modo duo triangula rectangul. nempe BDA & BDC.

In triangulo Sphærico BDA posita quam ang. recti basis AB data sit, una cum angulo adjacen. A; crura ang. recti BD & AD & 2 probl. hujus investigabuntur & per 13 probl. dabitur quoque ang. alter ABD, qui si minor fuerit reperto quæsito triang. propositi angulus ABC, cadet arcus perpendicularis BD intra triangulum: sin vero major, cadet extra. Ablato minori de majori, id est, subtracto ABD ang. ab ABC ang. vel hoc ab illo, datus quoque erit angulus DBC reliquus.

Porro in triangulo BDC rectangulo altero quia invenimus crus ang. recti BD angulumque eidem adjacentem DBC: per probl. 7 reperietur basis BC, esq; in triang. proposito LATUS QUÆSITUM ALTERUM. Consequenter ex eisdem datis crus DC per 5 probl. & ang. tertius DCB per 15 probl. non ignorabuntur. Cadente perpendiculari intra triang. hic angulus DCB repertus erit ANGULUS TRIANGULI PROPOSITI DESIDERATUS TERTIUS: Cadente vero extra, tunc complementum ejus ad semicirculum dabit desideratum angulum.

Postmodum in primo casu summa crurum inventorum AD & CD TERTIUM QUÆSITUM LATUS AC notum efficiet: in posteriori casu crus CD ab AD subtractum, reliquum faciet quæsitum AC latus.]

Problem. 18.

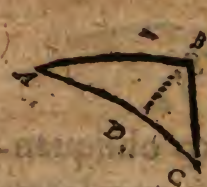
Datis in triang. Sphærico obliquangulo duobus angulis, cum latere

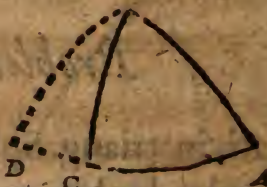
alteri eorum opposito: reliqua latera & angulum tertium explorare, dummodo constiterit utrum latus ignotum angulum alterum datum subtendens, quadrante maius fuerit, an minus.

Perpendicularis enim arcus a termino lateris dati in latus utrique angulo dato adjacens continuatum (si oportet) descendens, obliquangulum triangulum propositum in duo triangula rectangula partitur, ex quorum calculo postulata innotescunt.

Illustratio per Exemplum.

In triangulo *ABC*, anguli ad *A* & *C* sint dati cum latere *AB*, nota quoque sit species alterius lateris BC. Dimittatur arcus perpendicularis *BD*, qui intra triangulum cadet si anguli ad *A* & *C* dati fuerint simul acuti vel obtusi: sin vero angulus unus acutus & alter obtusus fuerit, cadet perpendicularis iste arcus extra triang.





Porro,

Porro, quia in triangulo *ADB* rectangulo, data est anguli recti basis *AB* cum ang adjacent. *A*, dabitur per 1 problema crus ang. recti *BD* & per 2 problema crus alterum *AD*. Nec non per 13 problema angulus *ABD*. 102

Rursus, quia in triangulo rectangulo *DBC* inventum est crus *DB*, & ex thesi datur ang. *C* cum specie basis *BC*: dabitur per problema 8 basis *BC*. *EST QVE LATVS QVÆSITVM VNVM*: nec non crus ang. recti *DC* cum angulo *DBC* per 4 & 16 probl. innotescunt. Si itaque inventus hic angulus *DBC* invento ang. *ABD* addatur (perpendiculari cadente intra triangulum) vel (contra) eidē auferatur, innotescet *ANGVLVS QVÆSITVS ABC*.

Consequenter latus inventum *AD* in primo casu adjectum lateri *DC*, vel ab eodem ablatum in casu secundo, notum efficiet *LATVS QVÆSITVM* alterum.]

Problem. 19.

Datis in triang. obliquangulo Sphærico duobus lateribus cum angulo alteri eorū opposito, insuper nota specie anguli reliquo lateri dato oppositi; reliquos angulos latusq; tertium invenire.

Perpendicularis enim ab angulo lateribus notis adjacente demissus in oppositam Basin

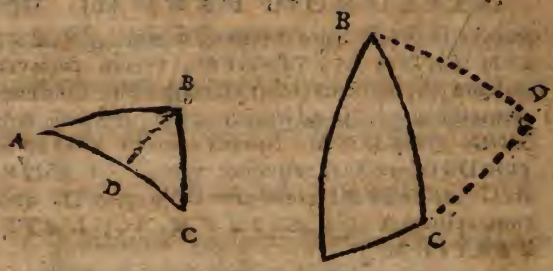
ambo AD & CD crura inventa efficient *QVÆSITVM LATVS*, AC, *TERTIVM*, verum enimvero cadente perpendiculari extra triangulum, tunc complementū ang. BAD ad semicirculum *DABIT BAC ANG. QVÆSITVM.* Insuper angulus BAD alvangulo DB subtractus, relinquet *ANG. QVÆSITVM* ABC *ALTERVM:* atque crus DA a crure DC ablatum, relinquet *QVÆSITVM*, AC, *LATVS TERTIVM.*

Problema 20.

In triangulo obliquangulo Sphærico datis duobus lateribus & angulo ab eis comprehenso: tertium latus & reliquos angulos concludere.

Perpendicularis enim a termino lateris unius noti in reliquum notum (si necesse sit productum) demissus: triang. propositum in duo rectangula dispescit, ex quorum calculo ignota colliguntur.

[Verbi gratia, in triangulo ABC sint data CB & CA latera comprehendentia angulum datum C. Vt tertium latus cum angulis duobus reliquis cognoscas, demittes arcum perpendicularem BD, idque a termino lateris dati usque in alterum latus notum (quando opus sit productum) hic enim perpendicularis arcus an extra an intra triang. cadet, calculus docebit.



Suntque duo rectangula triangula constituta, utpote ADB & BDC itaque in triangulo BDC ex data angul. recti basi BC, cum angulo alterutro, C investigantur crura BD & CD per 1 & 2 probl. nec non dabitur angulus DBC per 13 probl. Porro, crus CD inventum si fuerit minus lateri CA dato, cadet perpendicul. arcus BD intra triangulum, sin vero eidem majus sit, cadet extra, utcumque sit, minus auferatur a majori, relinquetur crus DA triang. ADB rectang.

Consequenter quia in triang. ADB rectang. data sunt ang. recti crura DA & DB, per 9 problema invenietur basis ang. recti BA, quæ est in triang. proposito *LATVS QVÆSITVM TERTIVM*, nec non per 14 problema anguli *ABD & BAD* innotescent.

Postmodum cadente perpendiculari intra triangulum, angulus BAD erit in triang. proposito *ANGVLVS QVÆSITVS*: secus complementum ejus ad semicirculum erit quæsitus BAC angulus: nec non in primo casu ang. ABD inventus addatur angulo *DBC*, vel contra in secundo casu ab eodem auferatur, innotescet angulus reliquus quæsitus ABC.]

Hactenus de resolutione obliquangulorum, quę fuit in reductione ad triangula rectangula: sequitur quorundam solutio sine reductione.

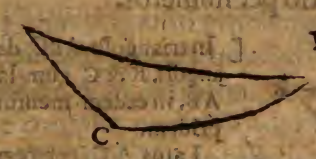
Probl.

Problema 21. 106

In triang. obliquangulo Sphærico datis duobus lateribus cum angulo uni eorum oppositio: angulum alteri lateri dato oppositum inquirere, dummodo species ejus cognoscatur sitne obtusus an acutus. Erit enim,

VT sinus	AD sinum	ITA sinus	AD sinum
lateris dati quod ang. notum subtendit.	*ang. dati & cogniti.*	*reliqui lateris noti.*	*ang. quæs.*

Illustratio per numeratos.



[In triang. ABC, obliquangulo, dentur latera AB & AC. Vtpote AB sit 41. & AC sit 6. gr. 14 m. Denique detur angulus ABC 8 gr. 50 m. Ang. C (quem pono esse obtusum) per regulam auream ita colliges.

VT sinus	AD sinum	ITA sinus	AD sinum ang.
lat. AC	*ang. B*	*lat. AB*	*C desiderati*
10857	15356	65605	92785

Atque sinui huic invento respondet in tabula sinuum arcus 68 6 fere, atque angulus datur obtusus, unde sumendum hujus arcus complementum ad semicirculum, eritque angulus C quæsitus 111, gr. 54 m.]

Probl.

latus fuerit quadrante majus, sumendum compl. ad semicirculum, utpote 173 gr. 46.]

Problema 23.

In triangulo Sphærico obliquangulo datis duobus cruribus singulatim quadrante minoribus, cum angulo ab eis comprehenso: latus tertium quod nempe angulum datū subtendit, per prosthaphæresin, id est, per additionem & subtractionem inquirere.

Hujus propositi problematis & proxime subsequentis frequentissimus est usus in rebus Astronomicis, & in Astrorum observationibus utramque complet. paginā. Vnde problemata usitata solent ab artificibus appellari; quorum solutionem methodo prosthaphæreseos utpote per additionem & subtractionem sine laboriosis numerorū divisionibus & multiplicationibus expediemus. Et hoc quidem resolutionis compendium quovis auro est pretiosius. Proposuerunt idem Nicolaus Vrsus Ditmarsus in fundamento suo Astronomico, & Barth. Pitiscus in Trigonometria, in quo tamen

men hallucinati nonnihil. Sed nos institutum nostrum fideliter prosequentes, aliorum labores hic carpere nolumus.

Resolutio sequitur, estque trimembris.

In resolutione hujus problematis triplex observandus est casus: crura enim data sunt conjunctim quadranti æqualia, sive minora, sive eidem majora: Unde tribus exemplorum generibus propositum problema explicabimus.

Primum genus exempl.

Vbi datis duobus cruribus conjunctim quadranti æqualibus, datoque angulo ab eis comprehenso: Latus tertium investigatur.

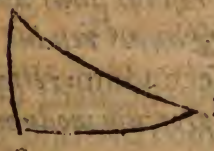
Crus minus jungatur cum complemento majoris, & producti sinus scribatur pro Invento primo, *& dimidium ejusdem erit* Inventum secundum: *& sinus versus anguli dati & cruribus comprehensi erit* Inventum tertium. *Inventum quartum per regulam auream hoc modo colliges.*

ut

ut Radius, *ad* Invent. 2: *ita* Inv. 3, *ad* Invēt. 4. 110

Inventum quartum auferatur ab inventoprimo, numerus residuus erit complementum lateris quæsiti.

Illustratio per numeros.



[In triangulo obliquangulo ABC sit datus angulus A 45 gr. 6 m. Cujus crura AB & AC simul sumpta sint quadranti æqualia, sitque crus AB 56 10 & crus AC 33 50; latus tertium BC hoc modo cognoscēs.

Crus majus AB	56 10	
Ejus complementum	33 50	
Adject. cruri minori AC	33 50	
Producitur arcus	67 40	
Cujus erit sinus	92499	Invent. primum.
Hujus semissis	46249	Invent. secundum.
Angulus datus A	45 gr. 6 m.	
Cujus sinus versus	29413	Invent. tertium.

Ex his Inventum 4 sic infertur.

VT Radius	*AD* Invent. 2.	ITA Invent. 3	*AD* Invēt. 4
100000	46249	29413	13605

Rursus ab invent. primo 92499
auferInvent. quartum 13605
Relinquit. sin. comp. lat. 78896
Vnde latus quæsitum BC est, erit 37 55.]

Secundum genus exempl.

In triangulo obliquangulo datis duobus

Auferatur ab Invent. 1 relinquit. 68391
Cujus semissis erit 34195 Invent. 2.
Porro ang. A. datur 108 45
Cujus sinus versus est 132144 Inuent. 3.
Consequenter
VT Radius AD Invent. 2. ITA invent. 3. AD 45186
100000 34195 132144 Invent. 4.
Inventum 4 auferatur ab
Invento primo, relinquitur 36300
Estque sinus compl. lateris quæsiti. Vnde latus BC Quæsitum erit 68 gr. 43 m.]

Tertium genus Exempl.

In triangulo obliquangulo datis duobus cruribus conjunctim quadrante majoribus, datoque angulo a cruribus comprehenso: latus tertium colligetur hoc modo.

Complementum cruris majoris addatur cruri minori, producti arcus sinus dabit Inventum primum, *idem deinde complementum auferatur a minori crure, residuique sinus ad inventum primum addatur, namque hujus semissis dabit* Inventū secundū.

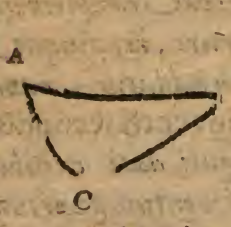
Porro sinus versus anguli dati exhibet Inventum tertium, *& inventum quartum colligitur ex aurea regula argumentando ut pridem.*

ut *Radius*, ad *Invent.* 2. ita *Inv.* 3. ad *Inv.* 4.

Inventum quartum conferendum cum invento primo, sin enim fuerint æqualia, indicio est latus quæsitum esse quadrantem: verùs si inventum quartum fuerit minus quam inventum primum, Latus trianguli quæsitum erit quadrante minus: quare inventum quartum auferendum a primo, numerus residuus erit sinus complementi lateris quæsiti, ut in prioribus.

Postea si inventum quartum fuerit majus quam primum: indicio est latus quæsitum excedere quadrantem. Quare inventum primum ab invento secundo ablatum relinquitur sinus excessus tertii lateris quæsiti supra quadrantem.

Illustratio per numeros.



[In triangulo ABC angulus C, sit 154 gr. 18 m. & crura AC, & CB sint conjunctim quadrante majora, crus majus BC detur 84 gr. 29 min. Crus minus AC sit datum 23 $31\frac{1}{2}$. Quæratur latus tertium AB.

Ad compl. cruris majoris utpote	5 gr.	31 m.
Addatur crus minus	23	$31\frac{1}{2}$
Producitur arcus	29	$2\frac{1}{2}$
Cujus sinus	48544	Invent. 1.

Rur-

Rursus complementum cruris majoris auferatur a minori crure, relinquitur arcus 18 gr. $0\frac{1}{2}$ m.
Cujus erit sinus 30915
Qui adjectus invent. 1. producitur 79459
Cujus semisis est 39729 Invent. 2.
Porro angulus C datur 154 18
Cujus sinus versus est 190108 Invent. 3.

Pro invento 4 licet argumentari ut pridem,

VT Radius AD invent. 2. ITA invent. 3. AD invent. 4.
100000 39729 190108 75528

Quia v. inventum 4 reperitur majus quam inventū 1. Indicium est, latus AB quæsitum quadrantem excedere. Vnde inventum 1 ab invento 4 ablatum relinquitur 26984. Sinus arcus excessus quo latus AB quæsitum excedit quadrantem, estque arcus iste in hoc exemplo 15 39 qui additus ad quadrantem 90 gr. constituit AB latus quæsitum 105 gr. 39'.]

Problema 24.

Trianguli Sphærici obliquanguli datis tribus lateribus: angulū quempiam a duobus cruribus singulatim quadrante minoribus comprehensum inquirere.

In hoc problemate eidem casus sunt observandi qui in antecedente, utpote crura angulum quæsitum comprehendentia aut conjunctim sunt quadranti æqualia vel minora

vel eidem majora. Unde quoque triplici exemplorum differentia resolutio hujus problematis erit pertractanda, in quibus inventum primum quemadmodum et secundum ad eundem prorsus modum inquiruntur ut in antecedenti.

Primum genus exemplorum.

In triangulo obliquangulo Sphærico datis tribus lateribus: angulum invenire cujus duo crura sunt conjunctim quadrāti æqualia.

Crus minus addatur complemento majoris producti sinus erit inventum primum, & ejus semissis dabit inventum secundū, quemadmodum in præcedente problemate. Porro sinus complementi tertii lateris ab invento primo auferatur, reliquus erit inventum tertium.

Ex his consequenter angulum quæsitum per regulam auream hoc modo concludes.

Vt inventum secundum ad Radium, ita inventum tertium, ad sinum versum compl. anguli quæsiti.

Secundum

Secundum genus exemplorum.

Vbi crura anguli quæsiti sunt conjunctim quadrante minora.

In his inventum primum & secundum investigantur ad eundem prorsus modum ut in antecedentis problematis exemplo 2.

Crus nimirum minus addatur complemento majoris, & producti sinus dabit inventum primum.

Deinde crus minus auferatur a complemento majoris, hujusque residui sinus ab invento primo sublatus, ejus semissis dabit inventum secundum.

Porro sinum complementi tertii lateris similiter ab invento primo subtrahe, relinquetur inventum tertium. Ex his angulum quæsitum & a cruribus comprehensum colliges hoc modo ratiocinando.

VT Invent. 2. AD Radium.
ITA Invent. 3. AD sinum versum compl. anguli quæsiti.

Tertium genus exemplorum.

Vbi crura anguli quæsiti sunt conjunctim quadrante majora.

Inventum primum & secundum hic quæruntur ut in antecedentis plobl. exemplo 3. Crus enim minus addatur complement. majoris, producti arcus sinus dabit inventum primum.

Idem quoque complementum cruris majoris aufer a crure minori, reliduique sinus addatur invento primo, producti semissis dabit inventum 2.

Porro si latus tertium datum fuerit quadrante minus, reliqua perficienda ut in hisce prioribus, hoc est, sinum complement. tertii lateris ab invento primo substrahe, reliquus dabit tibi invent. 3. Vnde concludes angulum quæsitum hoc modo.

VT Invent. 2. AD Radium.
ITA Invent. 3. AD sinum versum compl. ang. quæsiti.

Verum enimvero, si latus tertium datum fuerit quadrante majus: tunc ejus excessus supra quadrantem quæratur sinus, addaturque is ad invent. 1. producetur inventum 3. unde pro angulo quæsito cognoscendo hoc modo ratiocinari licet.

VT Inventum 2. AD Radium.

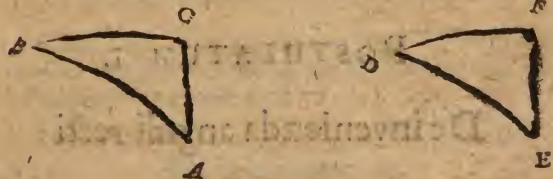
ITA

ITA *Invent.* 3. *AD sinum versum ang. quæsiti.*

Problema 25.

Trianguli obliquanguli datis tribus angulis latus quodvis investigare.

Hujus probl. prorsus eadem erit solutio cum antecedente; dummodo assumatur aliud triangulum quod cum triang. propositio angulos in latera permutat, idque ipsum qua conditione fieri possit ostendimus in 36 prop. 1. partis hujus, quam propositionem qui bene intellexerit nihil hic amplius desiderabit.



Verbi gratia, proponatur triang. ABC, cujus anguli singuli dentur, utpote ang. A 30 gr. ang. B 59 gr. 30 m. ang. C 103 grad. Pro isto triangulo assumendum aliud DEF triang. quorum latera angulis istis datis respondeant, utpote latus maximum D E respondeant complemento ang. maximi C sitque proinde 77. grad. latus

minimum DF respondeat angulo itidem minimo A, quod proinde erit 30 gr. latus denique EF sit 59 30 respondens nimirum angulo B. Quare cum trianguli DFE assumpti latera tria sint data, per antecedens 24 Probl. tres ipsius anguli non ignorabuntur: qui quidem anguli respondent lateribus trianguli propositi ABC, pro angulo tamen maximo F assumpto ejus ad duos rectos complemento.

Sequitur resolutio rectilineorum triangulorum, & primum de rectangulis, quæ nimirum unicum habent angulum rectũ, & reliqui duo sunt acuti: ac cognito unico acuto, reliquus non ignorabitur, est enim ejusdem ad quadrantem complemẽtum, ut constat ex 31 prop. partis 1 hujus. Porro in triang. rectangulis inveniri debent aut *Basis* anguli recti, aut *Crura*, aut *Anguli*.

POSTULATUM I.

De invenienda anguli recti BASI.

Problema 1.

Ex utroque crure dato.

Adde

Adde in unam ſummam quadrata crurum datorum, efficietur quadratum Baſis, cujus radix quadrata producet Baſin.

Problema 2.

Ex Angulis & Crure alterutro. *erit enim*

VT Radius, AD ſecant. *dat. crur. adjacentis.* ang. ITA datum crus. AD Baſin.

POSTULATUM 2.

De inquirendis CRVRIBVS anguli recti.

Problema 3.

Ex crure alterutro, & Baſi.

Quadratum cruris dati ex quadrato Baſis auferatur, relinquitur quadratum cruris quæſiti, cujus radix quadrata faciet quæſitum crus.

Problema 4.

Ex crure alterutro & angulis. *erit enim*

VT Radius, AD tang. *dato cruri oppoſiti.* ang. ITA crus *datum* AD crus *quæſ.*

Problema 5.

Ex Basi, & angulis. *erit enim*

VT radius, AD sinus *ang. quaes. crur. oppositi.* ITA basis AD crus *quaes.*

POSTULATUM 3.

De ANGVLORVM investigatione.

Problema 6.

Ex utroque crure.

VT crus, AD crus *reliquum* ITA radius AD tang. *ang. crur. reliq. oppositi.*

Problema 7.

Ex basi, & crure alterutro.

VT basis AD datum crus, ITA radius AD sinum *ang. dato crure oppositi.*

De obliquang. triang.

In his sciendum quod datis duobus angulis, tertius semper existit datorum angulorum

rum complementum ad semicirculum. ut est in 31 prop. part. 1 hujus.

Problema 8.

In triangulo rectilineo obliquangulo datis duobus angulis cum latere quocunque. Angulum tertium & reliqua latera investigare.

Subductis duobus angulis datis ex semicirculo relinquitur tertius. Porro

Vt se habet sinus anguli lateri dato oppositi, ad latus datum: ita etiam reliquorum angulorum sinus, ad latera opposita.

Institutio exemplaris.

In triang. ABC obliquang. dentur { ang. A 27 3 m. / ang. B 111 32 26" / latus AB 32 part.

Reliqua inquiruntur hoc modo.

Demptis duobus angulis datis ex semicirculo relinquitur angulus tertius C 41 gr. 24 m. 34. Porro

Vt sinus ang. C dato lateri AB oppositi 66143.

Ad latus datum AB 32.

Ita sinus anguli A 45477.

Ad latus BC quod angulo A oppositum est 22 fere.

Consequenter quoque erit,

Vt sinus anguli C 66143

Ad

Ad latus eidem oppositum AB	32
Ita sinus anguli B	93016
Ad latus AC angulo B oppositum	45

Problema 9.

Datis duobus triang. obliqu anguli lateribus, & angulo non ab eis comprehenso obtuso (vel si acuto data anguli specie alteri lateri oppositi) latus tertium cum reliquis angulis invenire.

Vt latus datum, dato angulo oppositum, est ad sinum anguli dati: ita latus alterum, ad sinum ang. oppositi minoris quadrante si species ang. acuta sit, majoris si acuta.

Dantur jam duo anguli, tertius est reliquus duorum datorum ad semicirculum.

Porro ut sinus anguli alterutrius noti, ad latus eidem oppositum: ita sinus anguli lateri incognito oppositi, ad latus tertium.

Exemplum.

In triangulo ABC dentur { Latus *AB* 32 / Latus *BC* 22 / Angulus *A* 27 3 m.

Tertium

Tertiũ latus, & reliquos angulos investigabis hoc modo.

Vt latus angulo dato oppositum BC	22
Ad sinum anguli dati A	45477
Ita latus alterum datum AB	32
Ad sinum anguli oppositi C	66143

Atq; sinui 66143 invento respondet arcus 41 24½ m. pro amplitudine ang. C acuti.

Dempto deinde utroque A & C angulo ex semicirculo, relinquitur ang. tertius obtusus B 111 32′ 26″. Porro

Vt sinus anguli A	45477
Ad latus eidem oppositum BC	22
Ita erit sinus ang. B	90316
Ad latus tertium AC	45

Problema 10.

Trianguli obliquang. datis duobus lateribus & angulo ab eis comprehenso; latus tertium & angulos reliquos inquirere.

Latera data componantur summæ dimidium est Inventum primum. *Latus minus auferatur ab invento primo, reliquus sit* Inventum secundum. *Consequentur angulus datus auferatur a semicirculo, residui dimidium fiat* Inventum tertium. *Quæraturq; arcus ejus dimidiati numerus tangens qui erit* Inventum quartum. *Porro*

Vt

Vt inventum primum, ad inventum secundum: ita inventum quartum, ad Inventum quintum.

Cum invento quinto ingredere tabulam tangent. arealiter, arcum ei respondentem excerpendo, hunc inventum arcum si auferas ab invento tertio, reliquus erit angulus trianguli minori lateri dato oppositus: sin vero eidem addas, productus erit angulus tertius majori lateri dato oppositus.

Latus denique tertium per 10 *probl. non ignorabitur. Erit enim*

Vt sinus alterut. anguli,
Ad latus oppositum,
Ita sinus ang. quæsiti lateri oppositi,
Ad latus quæsitum.

Exemplum.

In triangulo *ABC* dentur { Latus *AB* 32, Latus *BC* 22, Ang. B 111 gr. 32 m. 26'

Reliqua inquiruntur ut sequitur.

Summa laterum *AB* & *BC* datorum est 54
Eorum semissis est *Invent. primum* 27
Auferatur exinde latus minus BC 22 reliquus est *Invent. secundum* 5
Compl. anguli dati B ad semicirc. est. 68 gr. 27' 34"
Cujus semissis est *Invent. tertium* 34 gr. 13 47
Hujus numeri tangens est *Invent. quart.* 68031

VT

VT invent.1. *AD* invent.2. ITA inv.4. *AD* invent.5.
27 5 68031 12598.

Atque numero 12598 inventi quinti respondet in tabula tangentium arcus 7 gr. 10 m. 47″.

Qui ablatus ab invento tertio 34 gr. 13′ 47″

Relinquitur angulus quæsitus A & lateri minori BC dato oppositus 27 3.

Quin etiam addatur eidem, producesangulum C 41 24 m. 34″. oppositum lateri majori dato.

Latus tertium AC ex 10 probl. concludes.

VT sinus *ang. A*	*AD* latus *oppos. BC*	ITA sinus *ang. B*	*AD* latus *oppos.* AC
45477	22	90316	45

Problema II.

Datis tribus trianguli obliquanguli lateribus: tres ejusdem angulos concludere. *In his erit*

VT Basis AD summū ITA crurum AD *inventum* trianguli crurum: differentia *primum.*

[Per Basin intelligimus latus trianguli maximum, ac proinde reliqua duo latera crura appellantur.]

Inventum primum auferatur a Basi sive latere dato maximo; residui semissis dabit Inventum secundum.

Inventum primum & secundum componantur, dabitur Inventum tertium.

Ex hisce inventis angulos trianguli hoc modo concludes. Erit enim

VT

VT crus AD Invent.2. ITA Radius, AD sinū comp. minus. anguli minori crur.adjacent.

Rursus.

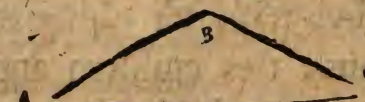
VT crus AD invent.3. ITA Radius, AD sinū compl. majus. ang.cruri majori adjacent.

Dantur ergo duo anguli, quibus a semicirculo sublatis, relinquitur tertius qui nempe basi opponitur.

Institutio exemplaris.

[In triang. ABC dentur { Crus AB 32, Crus BC 22, Basis AC 45

Angulos ejus trianguli sic cognosces, primum erit



VT basis AD summam AC 45 ITA crurum AD inventum crurum BC & AB 54 differentia 10. prim. 12

Inventum hoc primum auferatur a basi, relinquuntur 33, quorum semissis est Inventum secundum utpote $16\frac{1}{2}$.

Inventum primum & secundum componantur, producetur inventum tertium $28\frac{1}{2}$.

VT crus minus BC 22. AD invent.2. $16\frac{1}{2}$ ITA Radius 100000 AD sin.cōp.ang. C crur.minor. adjac.75000

Atque sinui invento 75000 respondet complementi arcus 41 gr. 24 m. 34″ tantusque est ang. C.

VT crus majus AB 32 AD invent.3. $28\frac{1}{2}$. ITA Radius 100000 AD sin.compl. ang. A adjac. crur. majori 89062.

Atque

Atque sin. 89062 respondet compl. arcus 27 3m. & tantus & angulus A.

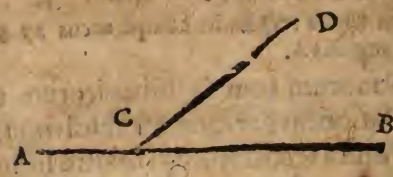
Et sic planorum tum & sphæricorum triangulorum solutionem per canones absolvimus. Sequitur mechanica rectilineorum solutio solius circini & regulæ beneficio, quæ arium mathematicarum tironibus nec ingrata nec inutilis erit.

Solutio Triangulorum Planorum Mechanica, beneficio circini & regulæ.

LEMMA.

Ad datam rectam lineam angulum rectilineum quotlibet gradus graduumq; partes continentem, constituere: & contra dato angulo rectilineo ejus amplitudinem in gradibus graduumve partibus cognoscere.

Hujus lemmatis prorsus eadem erit solutio cum priori quod pag. 23 h. proposuimus. Sit enim data linea recta AB, & punctum in ea datum C, ex quo jubeor angulum exci-

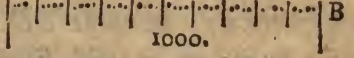


tare rectilineum gradus 38 & 45 m. comprehendentem. Semicirculus præparatus cujus figuram pag. 24 apposuimus ita accommodandus ut latus ejus rectilineum lineæ AB datæ, nec non & centrum puncto C respondeat. Deinde inter partes semicirculi divisas, incipiendo ab AB linea, numerabis amplitudinem anguli propositi 38 gr. 45 m. hoc est 38 gr. cum tribus quartis gradus, terminus numerationis signetur litera D. Deinde remoto semicirculo, ex puncto C perque signaturam D duces rectam CD, quæ cum AB linea conficiet angulum desideratum. VICISSIM si datus sit angulus rectilineus BCD velisque ejus indagare amplitudinem, applicabis semicirculum juxta modum præscriptum centro suo ad punctu C, gradus enim peripheriæ inter duas AB & CD lineas comprehensæ indicabunt amplitudinem anguli desideratam.

Hoc præmisso lemmate facillima ratione

omnia

omnia triangulorum planorum problemata solvemus, huic negotio accommodando lineam rectam in 100 *vel* 1000 *æquales partes divisas, cujus figuram hic depictam videtis in linea AB divisa.*

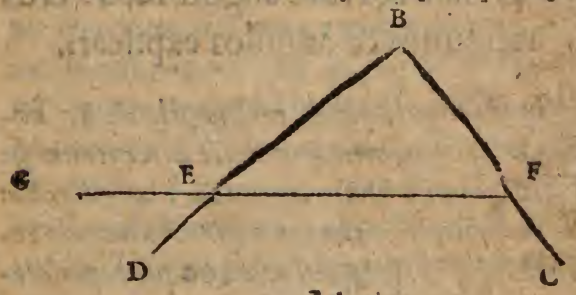


SOLVTIO RECTANGVLORUM.

Problema 1.

Ex dato crure utroque, Basin anguli recti & utrumq; angulum acutum, dicto citius, deprehendere.

Verbi gratia in triangulo plano rectangulo alterutrum crus detur 800 *part. reli-*



quum crus 600 part. Pro basi & angulis inveniendis beneficio normæ vel per 11 p. 1 Eucl. in planitie procreato angulū rectum B ductis lineis BD & BC. Deinde ex linea AB divisa sumito per circinum partes 800 hanc circini expansionem mensurato in BD linea ab angulo recto B usque ad E. Eodem modo accipe per circinum intercapedinem 600 part. in linea AB divisa numeratarum, eamque mensurato in BC linea a B usque ad F. Tandem ducatur Basis trianguli FE, cujus amplitudinem per circinum acceptam facile cognosces ex partibus lineæ AB divisæ, angulos præterea ex lemmate præmisso acquires.

Problema 2.

Datis basi & crure anguli recti: crus reliquum & angulos expiscari.

In triangulo plano rectangulo detur basis part. 1000, crus ang. recti alterutrum sit 800 partium: crus reliquum & angulos hoc modo cognosces, primum exstructo angulo recto DBC, intercapedinem 800 part. per circinum

cinum ex linea AB divisa acceptam, mensurato in BD, a B usque ad E, deinde accipe per circinum 1000 *partes, & posito uno ejus pede in punctum E altero intersecabis BC lineam ad punctum F, ducenda itaque basis EF ut fiat triang. rectangulum FBE, cujus crus FB cum angulis ad F & E acutis facile mensurabis ut supra.*

Problema 3.

Data basi cum angulo acuto crura anguli recti venari.

Basis anguli recti sit data 1000 *part. angulus alteruter sit* 53^{1} *cujus ad quadrantem complement. exhibet angulum reliquum* 36$\frac{5}{6}$. *Vnde crura anguli recti cognosces si accepta per circinum distantia* 1000 *part. in FG linea mensuraveris ab E usque ad F, deinde ad lineam & anguli recti basin EF primum ex puncto F erigatur angulus alteruter acutus utpote* 53^{1} *gr. ducta linea FB. Similiter ex E puncto erigatur angulus alter datus* 36$\frac{5}{6}$ *ducta linea EB: utraque linea se invi-*

cem secabunt ad angulum rectum in punctum B, unde crura EB & FB facile ex linea divisa per circinum mensurabis.

Problema 4.

Dato crure cum angulis acutis: reliquum Crus & Basin anguli recti cognoscere.

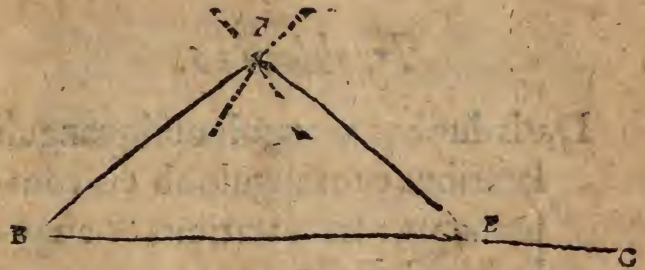
In triangulo rectangulo crus alterutrum sit datum 800 *part. Anguli sint ut pridem, hoc est ang. minor sit* $36\frac{5}{6}$, *angulus major* $53\frac{1}{6}$. *Prius construatur angulus rectus DBC. In linea BD a B usque ad E numeretur crus datum, & per circinum ex linea AB divisa acceptum utpote* 800 *part. ex puncto E erigatur ad BD lineam angulus dato cruri adjacens* $36\frac{5}{6}$ *ducta linea EF, quæ intersecabit lineam BC ad punctum F, unde fiet triangulum EBF, cujus basis EF & crus incognitum BF facile ex partibus lineæ AB divisæ numerari possunt.*

SOLVTIO TRIANGVLORUM OBLIQUANGULORUM.

Proble-

Problema 5.

Datis tribus trianguli obliquanguli lateribus : tres ejusdem angulos concludere.



In triangulo obliquangulo latus primum detur 815, *latus alterum* 1340, *et tertium sit earundem partium* 898: *quærantur ejusdem trianguli tres anguli. Primum in linea BC producta mensuretur latus datorum maximum a B usque ad E, utpote sumendo ex linea* AB *divisa partes* 1340. *Deinde accipe intercapedinem alterutrius lateris dati, utpote* 898 *part. & posito circini pede in punctum* B, *altero signabis arcum obscurum & deletilem. Denique assumes per circinum partes tertii lateris* 815, *& cum hac intercapedine circini*

ex puncto B *signabis alterum arcum secantem priorem in punctum F. Ducanturque lineæ* BF *&* BF, *eritque triangulum constitutum: quorum angulos cognoscere poteris ex lemmate, erit enim angulus F* $102\frac{5}{6}$ *angulus* B $36\frac{1}{3}$ *ang.* B $40\frac{5}{6}$.

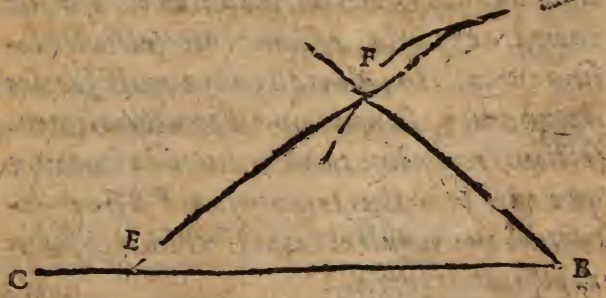
Problema 6.

Datis duobus trianguli obliquanguli lateribus cum angulo ab eis comprehenso: latus tertium & angulos concludere.

In triangulo obliquangulo sit angulus datus $40\frac{5}{6}$ *gr. crus ejus alterutrum sit* 1340, *alterum crus sit* 815: *latus tertium, & angulos reliquos hoc modo concludes. Primum ex lemmate constitues angulum datum* $40\frac{5}{6}$, *ductis lineis* BC *&* BF, *deinde accepta per circinum intercapedine* 1340 *part. mensurabis eam in* BC *linea a* B *usque ad* E, *similiter intercapedinem* 815 *part. mensurato in* BF *linea a* B *usque ad* F *ducaturque linea* EF *ut fiat triangulum* BFE, *in quo angulos & latera mensurabis ex lemmate ut supra.* Datis

Problema 7.

Datis trianguli obliquanguli duobus lateribus & angulo non ab eis comprehenso obtuso (aut si acuto data anguli specie alteri lateri oppositi) angulos reliquos & tertium latus inquirere.



In triangulo obliquangulo detur angulus 40½, *latus angulo dato adjacens sit* 1340, *latus eidem angulo oppositum sit* 898 *part. ang. F alt. lat. dato oppositus detur obtusus. Latus tertium & angulos reliquos hoc modo investigabis. Primum in linea* BC *mensurato a* B

usque ad E *latus angulo dato adjacens, utpote partes* 1340 *ex linea* AB *divisa per circinum acceptas: deinde ex* B *puncto erigatur ex lemmate angulus datus* $40\frac{1}{2}$, *ducta linea* EF: *deinde per circinum accepta intercapedine alterius lateris dati, utpote* 898 *part. pone unum ejus pedem in punctum* E *altero intersecabis lineam* BF *productam, in punctum F & hæc quidem intersectio contingere potest duobus in locis, utpote in loco, respectu puncti* B, *propiori, & in loco ab eodem puncto remotiori: unde quando species anguli datur obtusa, ut in nostro exemplo, assumes intersectionis locum viciniorem; alias quando anguli species datur acuta, sumendum est punctum intersectionis remotius: tandem ducenda linea* EF *quæ cum prioribus triangulum FBE constituet; in quo anguli et latus tertium mensurari possunt ut supra.*

Problema 8.

Trianguli obliquanguli datis duobus angulis cum latere quocunque: angulum

gulum tertium, & reliqua latera inveſtigare.

Subductis duobus angulis datis ex ſemicirculo, relinquitur tertius. Deinde in BC *linea menſurato a* B *uſque ad* E *partes lateris dati per circinum, ex linea* AB *diviſa, acceptas: Poſtmodum ex puncto* B *excitetur ad lineam* BC *angulus lateri dato adjacens alteruter, ducta linea* BF. *Similiter ex puncto quoq;* E *ad eandem* BC *lineam excitetur angulus alter lateri quoque dato adjacens, ducendo lineam* EF: *& fiet triangulum* EBF, *cujus latera incognita beneficio circini, ex partibus lineæ* AB *diviſæ, menſurari poſſunt ut ſupra.*

Atque ſic expoſitus nobis eſt inſignis ille & aureus triangulorum calculus pro ut inſtituto noſtro in ſequentibus inſerviet, qui ſi latius debuiſſet tractari, ſingulari opus erat volumine: fundamenta enim & demonſtrationes eorum ex ſcholis geometricis petenda, nobis de induſtria hic omittuntur. Habui id quidem in animo ut calculũ Ptolemei, Regiomontani, Copernici, & omnium deniq; recentiorum illuſtriorem & expeditiorem redderẽ: In eo itaque lector philomates te exerceas oportet

tét, si modo ad cælum evolare, arcum globi terreni bene metiri, & fructum hinc uberrimum consequi volueris.

Quamvis ita plane & perspicue hunc triangulorum calculum propositum arbitror, ut ulteriori additione opus non sit. Quo tamen promptior & expeditior quæsitorum inventio fiat, placuit per recapitulationē singula problemata hic recensere.

Recapitulatio problematum triangulorum sphæricorum & primum.

De rectangulis triangulis, in quibus aut crus *anguli recti: aut* basis *ejusdem: aut* angulis *quæruntur.*

Inquisitio cruris anguli recti.

E datis.

1 Basi cum angulo cruri quæsito opposito.
2 Basi cum angulo cruri quęsito adjacente.
3 Basi cum crure alterutro.
4 Crure cum angulo cruri quæsito adjacente.
5 Crure cum angulo cruri quæsito opposito.
6 Vtroque angulo acuto.

Inqui-

Inquisitio Basis,

E datis.

7 Crure cum angulo eidem adjacente.
8 Crure cum angulo eidem opposito.
9 Crure utroque.
10 Angulo utroque acuto.

Inquisitio anguli acuti.

E datis.

11 Basi cum crure angulo quæsito opposito.
12 Basi cum crure angulo quæsito adjacente.
13 Basi cum altero angulo.
14 Crure utroque.
15 Crure angulo quæsito opposito, cum altero angulo.
16 Crure angulo quæsito adjacente cum altero angulo.

Recapitulatio problematum triangulorum sphæricorum obliquangulorum.

Primum de integrorum triangulo-

rum

rum solutione, per reductionem eorundem ad triangula rectang.

Idque e datis.

17 Angulis duobus cum latere illis interjacente.
18 Angulis duobus cum latere uni eorũ oppositi.
19 Lateribus duobus cum angulo alteri eorum oppositio.
20 Lateribus duobus cum angulo ab eis comprehenso.

Resolutio partis triang. obliq. sine reductione ad rectang.

Inquisitio lateris.

E datis.

23 Lateribus duobus & ang. ab eis comprehenso.
22 Angulis duobus et latere vni eorum oppositio.
25 Angulis tribus.

Inquisitio Anguli.

E datis.

21 Lateribus duobus & ang. uni eorũ oppositio.
24 Lateribus tribus.

Recapi-

Recapitulatio probl. triangulorum rectilineorum.

Primum de rectangulis triangulis.

In his sciendum quod dato unico angulo acuto, reliquus sit compl. ad quadrantem per 31 *pr. partis* 1.

Inquisitio basis anguli recti.

E datis.

1 Vtroque crure.
2 Angulo & crure alterutro.

Investigatio cruris.

E datis.

3 Crure alterutro & Basi.
4 Crure alterutro & Angulo.
5 Basi & angulo.

Inquisitio anguli.

E datis.

6 Crure utroque.
7 Basi cum crure alterutro.

Reso-

Resolutio Obliquangulorum Triangulorum.

E datis.

In his notandum, quod datis duobus angulis, tertius exsistit datorum angulorum complementum ad semicirculum.

8 Angulis duobus cum latere.
9 Lateribus duobus cum angulo non ab eis cõprehenso.
10 Lateribus duobus cum angulo ab eis comprehenso.
11 Lateribus tribus.

Finis Tom. 2.

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Canon Triangulorum

SIVE

TABVLAE

SINVVM

TANGENTIVM

ET

SECANTIVM

Ad partes radii 100000. & ad scrupula prima Quadrantis.

O	Sinuum		Tangentiū	Secantium		
0						
1	29	100000	29 343774673	100000	343774687	59
2	58	99999	58 171887315	100000	171887344	58
3	87	99999	87 114591532	100000	114591576	57
4	116	99999	116 85943628	100000	85943387	56
5	145	99999	145 68754888	100000	68754961	55
6	175	99999	175 57295720	100000	57295807	54
7	204	99999	204 49110602	100000	49110703	53
8	233	99999	233 42971756	100000	42971873	52
9	262	99999	262 38197099	100000	38197230	51
10	291	99999	291 34377371	100000	34377516	50
11	320	99999	320 31252137	100001	31252297	49
12	349	99999	349 28647774	100001	28647948	48
13	378	99999	378 26444080	100001	26444269	47
14	407	99999	407 24555198	100001	24555402	46
15	436	99999	436 22918166	100001	22918384	45
16	465	99999	465 21485762	100001	21485995	44
17	495	99999	495 20221875	100001	20222122	43
18	524	99999	524 19098419	100001	19098681	42
19	553	99999	553 18093220	100002	18093496	41
20	582	99999	582 17188540	100002	17188831	40
21	611	99999	611 16370019	100002	16370325	39
22	640	99998	640 15625908	100002	15626228	38
23	669	99998	669 14946502	100002	14946837	37
24	698	99998	698 14323712	100002	14324061	36
25	727	99997	727 13750745	100003	13751108	35
26	756	99997	756 13221851	100003	13222270	34
27	785	99997	785 12732134	100003	12732526	33
28	814	99997	815 12277396	100003	12277803	32
29	842	99996	844 11854018	100004	11854440	31
30	873	99996	873 11458865	100004	11459301	30

O	Sinuum		Tangentiū		Secantium		
30	873	99996	873	11458865	100004	11459301	30
31	902	99996	902	11089205	100004	11069653	29
32	931	99996	931	10742644	100004	10743114	28
33	960	99995	960	10417094	101005	10417574	27
34	989	99995	989	10110690	100005	10111185	26
35	1018	99995	1018	9821794	100005	9822303	25
36	1047	99995	1047	9548948	100005	9549471	24
37	1076	99994	1076	9290849	100006	9291387	23
38	1105	99994	1105	9046334	100006	9046886	22
39	1134	99994	1135	8814357	100006	8814924	21
40	1164	99993	1164	8593980	100007	8594561	20
41	1193	99993	1193	8384351	100007	8384947	19
42	1222	99993	1222	8184704	100007	8185315	18
43	1251	99992	1251	8994343	100008	7994968	17
44	1280	99992	1280	7812634	100008	7813274	16
45	1309	99991	1309	7639001	100009	7639655	15
46	1338	99991	1338	7472917	100009	7473586	14
47	1367	99991	1367	7313899	100009	7314583	13
48	1396	99990	1396	7161507	100010	7162205	12
49	1425	99990	1425	7015335	100010	7016047	17
50	1454	99989	1455	6875009	100011	6875736	10
51	1483	99989	1484	6740185	100011	6740927	9
52	1513	99989	1513	6610547	100011	6611304	8
53	1542	99988	1542	6485881	100012	6486572	7
54	1571	99988	1571	6365674	100012	6366450	6
55	1600	99987	1600	6249915	100013	6250715	5
56	1629	99987	1629	6138291	100013	6139104	4
57	1658	99986	1658	6030580	100014	6031411	3
58	1687	99986	1687	5926587	100014	5927431	2
59	1716	99985	1716	5826117	100015	5826975	1
60	1745	99985	1746	5728996	100015	5728869	0

I	Sinuum		Tangentiū		Secantium		
0	1745	99985	1745	5728996	100015	5729869	60
1	1774	99984	1775	5635061	100016	5635946	59
2	1803	99984	1804	5544151	100016	5545053	58
3	1832	99983	1833	5456130	100017	5457046	57
4	1862	99983	1862	5370859	100017	5371790	56
5	1891	99982	1891	5288211	100018	5289156	55
6	1920	99982	1920	5208065	100018	5209012	54
7	1949	99981	1949	5130316	100019	5131290	53
8	1978	99980	1978	5054851	100020	5055840	52
9	2007	99980	2007	4981573	100020	4982562	51
10	2036	99979	2036	4910388	100021	4911406	50
11	2065	99979	2066	4841208	100021	4842241	49
12	2004	99978	2095	4773950	100022	4774997	48
13	2123	99977	2124	4708534	100023	4709596	47
14	2152	99977	2153	4644886	100023	4645963	46
15	2181	99976	2182	4582935	100024	4584026	45
16	2211	99976	2211	4522614	100024	4523720	44
17	2240	99975	2240	4463860	100025	4464980	43
18	2269	99974	2269	4406611	100026	4407746	42
19	2298	99974	2294	4350812	100026	4351961	41
20	2327	99973	2328	4296408	100027	4297571	40
21	2356	99972	2357	4243346	100028	4244526	39
22	2385	99972	2386	4191579	100028	4192772	38
23	2414	99971	2415	4141056	100029	4142266	37
24	2443	99970	2444	4091741	100030	4092963	36
25	2472	99969	2473	4043585	100031	4044820	35
26	2501	99969	2502	3996546	100031	3997797	34
27	2530	99968	2531	3950590	100032	3950590	33
28	2560	99967	2560	3905677	100033	3906958	32
29	2589	99964	2589	3861778	100034	3863068	31
30	2618	99966	2619	3818853	100034	3820155	30

TABVLAE

I	Sinuum		Tangentiū		Secantium		
30	26189	99966	26193	818853	100034	3820155	30
31	26479	99965	26483	776861	100035	3778185	29
32	26769	99964	26773	735790	100036	3737127	28
33	27059	99963	27063	695600	100037	3696953	27
34	27349	99963	27353	656266	100037	3657633	26
35	27639	99962	27643	617760	100038	3619141	25
36	27929	99961	27933	580055	100039	3581452	24
37	28219	99960	28223	543123	100040	3544540	23
38	28509	99959	28513	506955	100041	3508380	22
39	28799	99959	28813	471511	100041	3472951	21
40	29089	99958	29103	436777	100042	3438232	20
41	29389	99957	29393	402730	100043	3404199	19
42	29679	99956	29683	369351	100044	3370835	18
43	29969	99955	29973	336620	100045	3338118	17
44	30259	99955	30263	304517	100046	3306030	16
45	30549	99953	30553	273020	100047	3274554	15
46	30839	99952	30843	242129	100048	3243671	14
47	31129	99952	31143	211810	100048	3213366	13
48	31419	99951	31433	182052	100049	3183623	12
49	31709	99950	31723	152839	100050	3154425	11
50	31999	99949	32013	124158	100051	3125758	10
51	32289	99948	32303	095993	100052	3097607	9
52	32579	99947	32593	068331	100053	3069960	8
53	32869	99946	32883	041158	100054	3042802	7
54	33169	99945	33173	014462	100055	3016120	6
55	33459	99944	33463	988230	100056	2989903	5
56	33749	99943	33763	962450	100057	2964137	4
57	34039	99942	34053	937111	100058	2938812	3
58	34329	99941	34343	912200	100059	2913917	2
59	34619	99940	34633	887709	100060	2889440	1
60	34909	99939	34923	863625	100061	2865370	0

2	Sinuum		Tangentiū		Secantium		
0	3490	99939	3492	2863625	100061	2865371	60
1	3519	99938	3521	2839949	100062	2841700	59
2	3548	99937	3550	2816642	100063	2818417	58
3	3577	99936	3579	2793723	100064	2795512	57
4	3606	99935	3609	2771174	100065	2772978	56
5	3635	99934	3638	2748985	100066	2750804	55
6	3664	99933	3667	2727149	100067	2728981	54
7	3693	99932	3696	2705656	100068	2707503	53
8	3723	99931	3725	2684498	100069	2686360	52
9	3752	99930	3754	2663669	100070	2665545	51
10	3781	99929	3783	2643160	100072	2645051	50
11	3810	99927	3812	2622964	100073	2624869	49
12	3839	99926	3842	2603074	100074	2604994	48
13	3868	99925	3871	2583482	100075	2585417	47
14	3897	99924	3900	2564183	100076	2566132	46
15	3926	99923	3929	2545170	100077	2547134	45
16	3955	99922	3958	2526436	100078	2528414	44
17	3984	99921	3987	2507976	100079	2509969	43
18	4013	99919	4016	2489783	100081	2491790	42
19	4042	99918	4046	2471851	100082	2473873	41
20	4071	99917	4075	2454176	100083	2456212	40
21	4100	99916	4104	2436751	100084	2438802	39
22	4129	99915	4133	2419571	100085	2421637	38
23	4159	99913	4162	2402632	100087	2404712	37
24	4188	99912	4191	2385928	100088	2388022	36
25	4217	99911	4220	2369454	100089	2371563	35
26	4246	99910	4250	2353205	100090	2355329	34
27	4275	99909	4279	2337178	100091	2339361	33
28	4304	99907	4308	2321367	100093	2323512	32
29	4333	99906	4337	2305768	100094	2307935	31
30	4362	99905	4366	2290377	100095	2292559	30

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2	Sinuum		Tangentiū		Secantium		
30	43629	99905	43662	290377	100095	229255	30
31	43919	99904	43952	275189	100097	227738	29
32	44209	99902	44242	260202	100098	226241	28
33	44499	99901	44541	245410	100099	224763	27
34	44789	99900	44837	230810	100100	223305	26
35	45079	99898	45132	216398	100102	221865	25
36	45369	99897	45417	202171	100103	220444	24
37	45659	99896	45702	188125	100104	219040	23
38	45949	99894	45992	174255	100106	217655	22
39	46239	99893	46282	160563	100107	216287	21
40	46529	99892	46581	147040	100108	214936	20
41	46820	99890	46871	133685	100110	213602	19
42	47110	99889	47160	120495	100111	212285	18
43	47400	99888	47450	107466	100113	210983	17
44	47690	99886	47740	094597	100113	209698	16
45	47980	99885	48030	081883	100115	208428	15
46	48270	99883	48330	069322	100117	207173	14
47	48560	99882	48620	056911	100118	205934	13
48	48850	99881	48910	044649	100120	204709	12
49	49140	99879	49200	032531	100121	203498	11
50	49430	99878	49490	020555	100122	202302	10
51	49720	99876	49780	008719	100124	201120	9
52	50010	99875	50070	997022	100125	199952	8
53	50300	99873	50370	985460	100127	198797	7
54	50590	99872	50660	974029	100128	197656	6
55	50880	99870	50950	962730	100130	196527	5
56	51170	99869	51240	951558	100131	195411	4
57	51460	99867	51530	940513	100133	194308	3
58	51750	99866	51820	929592	100134	193218	2
59	52050	99864	52120	918793	100136	192139	1
60	52340	99863	52410	908114	100137	191073	0

3	Sinuum		Tangentiũ		Secantium		
0	5234	99883	5241	1908114	100137	1910732	60
1	5263	99861	5270	1897552	100139	1900185	59
2	5292	99860	5299	1887107	100140	1889755	58
3	5321	99858	5328	1876775	100142	1879438	57
4	5350	99857	5357	1866556	100143	1869233	56
5	5379	99855	5387	1856447	100145	1859139	55
6	5408	99851	5416	1846447	100147	1849153	54
7	5437	99852	5445	1836554	100148	1839274	53
8	5466	99850	5474	1826765	100150	1829500	52
9	5495	99849	5503	1817081	100151	1819830	51
10	5524	99847	5533	1807498	100153	1810262	50
11	5553	99846	5562	1798015	100155	1800794	49
12	5582	99844	5591	1788631	100156	1791424	48
13	5611	99842	5620	1779344	100158	1782152	47
14	5640	99841	5649	1770153	100159	1772975	46
15	5669	99839	5678	1761056	100161	1763893	45
16	5698	99838	5708	1752052	100163	1754903	44
17	5727	99836	5737	1743139	100164	1746005	43
18	5756	99834	5766	1734315	100166	1737196	42
19	5785	99833	5795	1725581	100168	1728476	41
20	5814	99831	5824	1716934	100169	1719843	40
21	5844	99829	5854	1708372	100171	1711297	39
22	5873	99827	5883	1699896	100173	1702835	38
23	5902	99826	5912	1691503	100175	1694456	37
24	5931	99824	5941	1683191	100176	1686159	36
25	5960	99822	5970	1674961	100178	1677944	35
26	5989	99821	5999	1666811	100180	1669808	34
27	6018	99819	6029	1658740	100182	1661751	33
28	6047	99817	6058	1650746	100183	1653772	32
29	6076	99815	6087	1642828	100185	1645869	31
30	6105	99813	6116	1634986	100186	1638041	30

TABVLAE

3	Sinuum		Tangentiū		Secantium		
30	6105	99813	6116	1634986	100187	1638041	30
31	6134	99812	6145	1627217	100189	1630287	29
32	6163	99810	6175	1619523	100190	1622607	28
33	6192	99808	6204	1611900	100192	1614999	27
34	6221	99806	6233	1604348	100194	1607462	26
35	6250	99804	6262	1596867	100196	1599995	25
36	6279	99803	6291	1589454	100198	1592597	24
37	6308	99801	6321	1582110	100200	1585268	23
38	6337	99799	6350	1574834	100201	1578005	22
39	6366	99797	6379	1567623	100203	1570810	21
40	6395	99795	6408	1560478	100205	1563680	20
41	6424	99793	6438	1553398	100207	1556613	19
42	6453	99792	6467	1546381	100209	1549611	18
43	6482	99790	6496	1539428	100211	1542672	17
44	6511	99788	6525	1532536	100213	1535795	16
45	6540	99786	6554	1525705	100215	1528979	15
46	6569	99784	6584	1518935	100216	1522223	14
47	6598	99782	6613	1512224	100218	1515527	13
48	6627	99780	6642	1505572	100220	1508890	12
49	6656	99778	6671	1498978	100222	1502310	11
50	6685	99776	6700	1492442	100224	1495788	10
51	6714	99774	6730	1485962	100226	1489323	9
52	6743	99772	6759	1479537	100228	1482913	8
53	6773	99770	6788	1473168	100230	1476558	7
54	6802	99768	6817	1466853	100232	1470258	6
55	6831	99766	6847	1460592	100234	1464011	5
56	6860	99764	6876	1454383	100236	1457817	4
57	6889	99762	6905	1448227	100238	1451676	3
58	6918	99760	6934	1442123	100240	1445586	2
59	6947	99758	6963	1436070	100242	1439547	1
60	6976	99756	6993	1430067	100244	1433559	0

4	Sinuum		Tangentiū		Secantium		
0	6976	99756	6993	1430067	100244	1433559	60
1	7005	99754	7022	1424113	100246	1427620	59
2	7034	99752	7051	1418209	100248	1421730	58
3	7063	99750	7095	1412354	100250	1415889	57
4	7092	99748	7110	1406546	100252	1410096	56
5	7121	99746	7139	1400786	100254	1404350	55
6	7150	99744	7168	1395071	100257	1398650	54
7	7179	99742	7197	1389405	100259	1392999	53
8	7208	99740	7227	1383783	100261	1387391	52
9	7237	99738	7256	1378206	100263	1381829	51
10	7266	99736	7285	1372674	100265	1376311	50
11	7295	99734	7314	1367186	100267	1370838	49
12	7324	99731	7344	1361741	100269	1365408	48
13	7353	99729	7373	1356340	100271	1360021	47
14	7382	99727	7402	1350980	100274	1354676	46
15	7411	99725	7431	1345663	100276	1349373	45
16	7440	99723	7461	1340387	100278	1344112	44
17	7469	99721	7490	1335152	100280	1338891	43
18	7498	99719	7519	1329957	100282	1333712	42
19	7527	99716	7548	1324803	100284	1328572	41
20	7556	99714	7578	1319688	100287	1323472	40
21	7585	99712	7607	1314613	100289	1318411	39
22	7614	99710	7636	1309576	100291	1313388	38
23	7643	99708	7665	1304577	100293	1308404	37
24	7672	99705	7695	1299616	100296	1303458	36
25	7701	99703	7724	1294692	100298	1298549	35
26	7730	99701	7753	1289806	100300	1293677	34
27	7759	99699	7782	1284956	100302	1288841	33
28	7788	99696	7812	1280142	100305	1284042	32
29	7817	99694	7841	1275363	100307	1279278	31
30	7846	99692	7870	1270620	100309	1274549	30

4	Sinuum		Tangentiũ		Secantium		
30	7846	99692	7870	1270620	100309	1274549	30
31	7875	99689	7899	1265912	100312	1269856	29
32	7904	99687	7929	1261238	100314	1265197	28
33	7933	99685	7958	1256600	100316	1260572	27
34	7962	99683	7987	1251994	100318	1255981	26
35	7991	99680	8017	1247422	100321	1251424	25
36	8020	99678	8046	1242883	100323	1246900	24
37	8049	99676	8075	1238377	100326	1242408	23
38	8078	99673	8104	1233903	100328	1237948	22
39	8107	99671	8134	1229461	100330	1233521	21
40	8136	99668	8163	1225051	100333	1229125	20
41	8165	99666	8192	1220672	100335	1224761	19
42	8194	99664	8221	1216324	100337	1220427	18
43	8223	99661	8251	1212006	100340	1216125	17
44	8252	99659	8280	1207719	100342	1211852	16
45	8281	99657	8309	1203462	100345	1207610	15
46	8310	99654	8339	1199235	100347	1203397	14
47	8339	99652	8368	1195037	100350	1199214	13
48	8368	99649	8397	1190868	100352	1195060	12
49	8397	99647	8427	1186728	100354	1190934	11
50	8426	99644	8456	1182617	100357	1186837	10
51	8455	99642	8485	1178533	100359	1182768	9
52	8484	99639	8514	1174479	100362	1178727	8
53	8513	99637	8544	1170450	100364	1174714	7
54	8542	99635	8573	1166450	100367	1170728	6
55	8571	99632	8602	1162476	100369	1166769	5
56	8600	99630	8632	1158529	100372	1162837	4
57	8629	99627	8661	1154609	100374	1158932	3
58	8658	99625	8690	1150715	100377	1155052	2
59	8687	99622	8720	1146847	100379	1151200	1
60	8716	99619	8749	1143006	100382	1147371	0

5	Sinuum		Tangentiũ		Secantium		
0	8716	99619	8749	1143005	100382	1147371	60
1	8745	99617	8778	1139188	100385	1143569	59
2	8774	99614	8807	1135397	100387	1139792	58
3	8803	99612	8837	1131630	100390	1136040	57
4	8831	99609	8866	1127889	100392	1132313	56
5	8860	99607	8895	1124171	100395	1128610	55
6	8889	99604	8925	1120478	100397	1124932	54
7	8918	99602	8954	1116809	100400	1121278	53
8	8947	99599	8983	1113163	100403	1117646	52
9	8976	99596	9013	1109542	100405	1114039	51
10	9005	99594	9042	1105943	100408	1110455	50
11	9034	99591	9071	1102368	100411	1106894	49
12	9063	99588	9101	1098815	100413	1103356	48
13	9092	99586	9130	1095285	100416	1099841	47
14	9121	99583	9159	1091777	100419	1096348	46
15	9150	99580	9189	1088292	100421	1092877	45
16	9179	99578	9218	1084829	100424	1089428	44
17	9208	99575	9247	1081387	100427	1086001	43
18	9237	99572	9277	1077967	100429	1082596	42
19	9266	99570	9306	1074569	100432	1079212	41
20	9295	99567	9335	1071191	100435	1075849	40
21	9324	99564	9365	1067835	100438	1072507	39
22	9353	99562	9394	1064499	100440	1069186	38
23	9382	99559	9423	1061184	100443	1065885	37
24	9411	99556	9453	1057890	100446	1062605	36
25	9440	99553	9482	1054615	100449	1059346	35
26	9469	99551	9511	1051361	100451	1056106	34
27	9498	99548	9541	1048126	100454	1052886	33
28	9527	99545	9570	1044911	100457	1049685	32
29	9556	99542	9600	1041715	100460	1046505	31
30	9585	99540	9629	1038540	100463	1043343	30

5	Sinuum		Tangentiũ		Secantium		
30	9585	99540	9629	1038540	100463	1043343	30
31	9614	99537	9658	1035383	100465	1040201	29
32	9642	99534	9688	1032245	100468	1037077	28
33	9671	99531	9717	1029126	100471	1033973	27
34	9700	99528	9746	1026025	100474	1030887	26
35	9729	99526	9776	1022943	100477	1027819	25
36	9758	99523	9805	1019879	100480	1024770	24
37	9787	99520	9834	1016833	100482	1021737	23
38	9816	99517	9864	1013805	100485	1018725	22
39	9845	99514	9893	1010795	100488	1015730	21
40	9874	99511	9923	1007803	100491	1012752	20
41	9903	99508	9952	1004828	100494	1009792	19
42	9932	99506	9981	1001871	100497	1006849	18
43	9961	99503	10011	998931	100500	1003923	17
44	9990	99500	10040	996007	100503	1001015	16
45	10019	99497	10069	993101	100506	998123	15
46	10048	99494	10099	990211	100509	995248	14
47	10077	99491	10128	987338	100512	992389	13
48	10106	99488	10158	984482	100515	989547	12
49	10135	99485	10187	981641	100518	986722	17
50	10164	99482	10216	978817	100521	983912	10
51	10192	99479	10246	976009	100524	981119	9
52	10221	99476	10275	973217	100527	978341	8
53	10250	99473	10305	970441	100530	975580	7
54	10279	99470	10334	967680	100533	972833	6
55	10308	99467	10363	964935	100536	970103	5
56	10337	99464	10393	962205	100539	967387	4
57	10366	99461	10422	959490	100542	964687	3
58	10395	99458	10452	956791	100545	962002	2
59	10424	99455	10481	954106	100548	959332	1
60	10453	99452	10510	951436	100551	956677	0

6	Sinuum		Tangentiū		Secantium		
0	10453	99452	10510	951436	100551	956677	60
1	10482	99449	10540	948781	100554	954037	59
2	10511	99446	10569	946141	100567	951411	58
3	10540	99443	10599	943515	100560	948800	57
4	10569	99440	10628	940904	100563	946203	56
5	10597	99437	10657	938307	100566	943620	55
6	10626	99434	10687	935724	100569	941052	54
7	10655	99431	10716	933155	100573	938497	53
8	10684	99428	10746	930599	100576	935957	52
9	10713	99424	10775	928058	100579	933430	51
10	10742	99421	10805	925530	100582	930917	50
11	10771	99418	10834	923016	100585	928417	49
12	10800	99415	10863	920516	100588	925931	48
13	10829	99412	10893	928028	100592	923458	47
14	10858	99409	10922	915554	100595	920999	46
15	10887	99406	10952	913093	100598	918553	45
16	10916	99402	10981	910646	100601	916120	44
17	10945	99399	11011	908211	100604	913699	43
18	10973	99396	11040	905789	100608	911292	42
19	11002	99393	11070	903379	100611	908907	41
20	11031	99390	11099	900983	100614	906515	40
21	11060	99386	11128	898598	100617	904146	39
22	11089	99383	11158	896227	100621	901788	38
23	11118	99380	11187	893867	100624	899444	37
24	11147	99377	11217	891520	100627	897111	36
25	11176	99374	11246	889185	100630	894791	35
26	11205	99370	11276	886862	100634	892482	34
27	11234	99367	11305	884551	100637	890186	33
28	11263	99364	11335	882252	100640	887901	32
29	11291	99360	11364	879964	100644	885628	31
30	11320	99357	11394	877689	100647	883367	30

6	Sinuum		Tangentiũ		Secantium		
30	11320	99351	11394	877689	100647	883367	30
31	11349	99351	11423	875425	100650	881118	29
32	11378	99351	11452	873172	100654	878880	28
33	11407	99347	11482	870931	100657	876653	27
34	11436	99344	11511	868701	100660	874438	26
35	11465	99341	11541	866482	100664	872234	25
36	11494	99337	11570	864275	100667	870041	24
37	11523	99334	11600	862078	100671	867859	23
38	11552	99331	11629	859893	100674	865688	22
39	11580	99327	11659	857718	100677	863528	21
40	11609	99324	11688	855555	100681	861380	20
41	11638	99320	11718	853402	100684	859241	19
42	11667	99317	11747	851259	100688	857113	18
43	11696	99314	11777	849128	100691	854996	17
44	11725	99310	11806	847007	100695	852889	16
45	11754	99307	11836	844896	100698	850793	15
46	11783	99303	11865	842795	100701	848707	14
47	11812	99300	11895	840705	100705	846632	13
48	11840	99297	11924	838625	100708	844566	12
49	11869	99293	11954	836555	100712	842512	11
50	11898	99290	11983	834496	100715	840466	10
51	11927	99286	12013	832446	100719	838431	9
52	11956	99283	12042	830406	100722	836405	8
53	11985	99279	12072	828376	100726	834390	7
54	12014	99275	12101	826355	100730	832384	6
55	12043	99272	12131	824345	100733	830388	5
56	12071	99269	12160	822344	100737	828402	4
57	12100	99265	12190	820352	100740	826425	3
58	12129	99262	12219	818370	100744	824457	2
59	12158	99258	12250	816398	100747	822500	1
60	12187	99255	12278	814435	100751	820551	0

7	Sinuum		Tangentiū		Secantium		
0	12187	99255	12278	814435	100751	820551	60
1	12216	99251	12308	822481	100755	818612	59
2	12245	99240	12338	810536	100758	816681	58
3	12274	99244	12367	808600	100762	814760	57
4	12302	99240	12397	806674	100765	812849	56
5	12331	99237	12326	804756	100769	810946	55
6	12360	99233	12456	802848	100773	809052	54
7	12389	99230	12485	800948	100776	807167	53
8	12418	99226	12515	799058	100780	805291	52
9	12447	99222	12544	797176	100784	803423	51
10	12476	99219	12574	795302	100787	801565	50
11	12504	99215	12603	793438	100791	799714	49
12	12533	99211	12633	791582	100795	797873	48
13	12562	99208	12662	789734	100799	796040	47
14	12591	99204	12692	787895	100802	794216	46
15	12620	99200	12722	786064	100806	792399	45
16	12649	99197	12751	784242	100810	790592	44
17	12678	99193	12781	782428	100813	788792	43
18	12706	99189	12810	780622	100817	787001	42
19	12735	99186	12840	778825	100821	785218	41
20	12764	99182	12869	777035	100825	783443	40
21	12793	99178	12899	775254	100828	781677	39
22	12822	99175	12929	773480	100832	779918	38
23	12851	99171	12958	771715	100836	778167	37
24	12880	99167	12988	769957	100840	776424	36
25	12908	99163	13017	768205	100844	774689	35
26	12937	99160	13047	766466	100848	772962	34
27	12966	99156	13076	764732	100851	771242	33
28	12995	99152	13106	763005	100855	769530	32
29	13024	99148	13136	761287	100859	767826	31
30	13053	99144	13165	759576	100863	766130	30

7	Sinuum		Tangentiũ		Secantium		
30	13053	99144	13165	759756	100863	766130	30
31	13081	99141	13195	757872	100867	764444	29
32	13110	99137	13224	756176	100871	762759	28
33	13139	99139	13254	754487	100875	761085	27
34	13168	99129	13284	752806	100878	759418	26
35	13197	99125	13313	751132	100882	757759	25
36	13226	99122	13343	749465	100886	756107	24
37	13254	99118	13372	747806	100890	754462	23
38	13283	99114	13402	746154	100894	752825	22
39	13312	99110	13432	744509	100898	751194	21
40	13341	99106	13461	742871	100902	749571	20
41	13370	99102	13491	741240	100906	747955	19
42	13399	99098	13521	739616	100910	746346	18
43	13427	99094	13550	737999	100914	744743	17
44	13456	99091	13580	736389	100918	743148	16
45	13485	99087	13609	734786	100922	741560	15
46	13514	99083	13639	733190	100926	739978	14
47	13543	99079	13669	731600	100930	738403	13
48	13572	99075	13698	730018	100934	736835	12
49	13660	99071	13728	728442	100938	735274	17
50	13629	99067	13758	726873	100942	733719	10
51	13658	99063	13787	725310	100946	732171	9
52	13687	99059	13817	723754	100950	730630	8
53	13716	99055	13846	722204	100954	729095	7
54	13744	99051	13876	720661	100958	727566	6
55	13773	99047	13906	719125	100962	726044	5
56	13802	99043	13935	717594	100966	724529	4
57	13831	99039	13965	716071	100970	723019	3
58	13860	99035	13995	714553	100975	721517	2
59	18891	99031	14024	713042	100975	720020	1
60	13917	99027	14054	711537	100983	718530	0

8	Sinuum		Tangentiũ		Secantium		
0	13917	99027	14054	711537	100983	718530	60
1	13946	99023	14084	710038	100987	717046	59
2	13975	99019	14113	708546	100991	715568	58
3	14004	99015	14143	707059	100995	714096	57
4	14033	99011	14173	705579	100999	712630	56
5	14061	99006	14202	704105	101004	711171	55
6	14090	99002	14232	702637	101008	709717	54
7	14119	98998	14262	701174	101012	708269	53
8	14148	98994	14291	699718	101016	706828	52
9	14177	98990	14321	698268	101020	705392	51
10	14205	98986	14351	696823	101024	703962	50
11	14234	98982	14381	695384	101029	702538	49
12	14263	98978	14410	693952	101033	701120	48
13	14292	98973	14440	692525	101037	699707	47
14	14320	98969	14470	691104	101041	698301	46
15	14349	98965	14499	689688	101046	696900	45
16	14378	98961	14529	688278	101050	695505	44
17	14407	98957	14559	686873	101054	694115	43
18	14436	98953	14588	685475	101059	692731	42
19	14464	98948	14618	684082	101063	691353	41
20	14493	98944	14648	682694	101067	689979	40
21	14522	98940	14678	681312	101071	688612	39
22	14551	98936	14707	679936	101076	687250	38
23	14580	98931	14737	678564	101080	685893	37
24	14608	98927	14767	677199	101084	684542	36
25	14637	98923	14796	675838	101089	683196	35
26	14666	98919	14826	674483	101093	681856	34
27	14695	98914	14856	673133	101097	680521	33
28	14723	98910	14886	671789	101102	677866	32
29	14752	98906	14915	670450	101196	677866	31
30	14781	98902	14945	669116	101111	676547	30

8	Sinuum		Tangentiū		Secantium		
30	14781	98902	14945	669116	101111	676547	30
31	14810	98897	14975	667787	101115	675233	29
32	14838	98893	15005	666463	101119	673924	28
33	14867	98888	15034	665145	101124	672620	27
34	14896	98884	15064	663831	101128	671321	26
35	14928	98880	15094	662523	101133	670027	25
36	14954	98876	15124	661219	101137	668738	24
37	14982	98871	15153	659921	101142	667455	23
38	15011	98866	15183	658627	101146	666176	22
39	15040	98862	15213	657339	101151	664901	21
40	15069	98858	15244	656055	101155	663633	20
41	15097	98854	15272	654777	101160	662369	19
42	15126	98849	15302	653503	101144	661110	18
43	15155	98845	15333	652234	101169	659855	17
44	15184	98841	15362	650969	101173	658603	16
45	15212	98836	15491	649710	101178	657361	15
46	15241	98832	15421	648456	101182	656121	14
47	15270	98827	15451	647206	101187	654886	13
48	15299	98823	15481	645960	101191	653655	12
49	15327	98818	15511	644720	101196	652429	17
50	15356	98814	15540	643484	101200	651208	10
51	15385	98809	15570	642253	101205	649991	9
52	15414	98805	15600	641026	101209	648779	8
53	15442	98800	15630	639804	101214	647572	7
54	15471	98796	15660	638587	101215	646369	6
55	15500	98791	15689	637373	101223	645170	5
56	15529	98787	15719	636165	101228	643976	4
57	15557	98782	15749	634961	101233	642787	3
58	15586	98778	15779	633761	101237	641602	2
59	15615	98773	15809	632566	101242	640421	1
60	15643	98769	15838	631375	101246	639245	0

9	Sinuum		Tangentiũ		Secantium		
0	15643	98769	15838	631375	101247	639245	
1	15672	98764	15868	630189	101251	638073	59
2	15701	98760	15898	629007	101256	636906	58
3	15730	98755	15828	627828	101261	635742	57
4	15758	98751	15958	626655	101265	634584	56
5	15787	98746	15988	625486	101270	633429	55
6	15816	98741	16017	624321	101275	632279	54
7	15845	98737	16047	623160	101279	631133	53
8	15873	98732	16077	622003	101284	629991	52
9	15902	98728	16107	620851	101289	628853	51
10	15931	98723	16137	619703	101294	627719	50
11	15959	98718	16167	618559	101298	626590	49
12	15988	98714	16196	617419	101303	625464	48
13	16017	98709	16226	616283	101308	624343	47
14	16046	98704	16256	615151	101313	623226	46
15	16074	98700	16286	614023	101317	622113	45
16	16103	98695	16316	612899	101322	621004	44
17	16132	98690	16346	611779	101327	619898	43
18	16160	98686	16376	610664	101332	618797	42
19	16189	98681	16405	609552	101337	617700	41
20	16218	98676	16435	608444	101352	616607	40
21	16246	98671	16465	607340	101346	615517	39
22	16275	98667	16495	606240	101351	614432	38
23	16304	98662	16525	605143	101356	613350	37
24	16333	98657	16555	604051	101361	612273	36
25	16361	98652	16585	602962	101366	611199	35
26	16390	98648	16615	601878	101371	610129	34
27	16419	98643	16645	600797	101376	609062	33
28	16447	98638	16674	599720	101381	608000	32
29	16476	98633	16704	598646	101386	606941	31
30	16505	98629	16734	597576	101391	605886	30

9	Sinuum		Tangentiū		Secantium		
30	16505	98629	16734	597576	101391	605886	30
31	16533	98624	16764	596510	101395	604834	29
32	16562	98619	16794	595448	101400	603787	28
33	16591	98614	16824	594390	101405	602743	27
34	16620	98606	16854	593335	101410	601702	26
35	16648	98604	16884	592283	101415	600666	25
36	16677	98600	16914	591236	101420	599633	24
37	16706	98595	16944	590191	101425	598603	23
38	16734	98590	16974	589151	101430	597577	22
39	16763	98585	17004	588114	101435	596555	21
40	16792	98580	17033	587080	101440	595536	20
41	16820	98575	17063	586051	101445	594521	19
42	16849	98570	17093	585024	101450	593509	18
43	16878	98565	17123	584001	101455	592501	17
44	16906	98561	17153	582982	101460	591496	16
45	16935	98556	17183	581966	101466	590495	15
46	16964	98551	17213	580953	101471	589497	14
47	16992	98546	17243	579944	101476	588502	13
48	17021	98541	17273	578938	101481	587511	12
49	17050	98536	17303	577936	101486	586524	11
50	17078	98531	17333	576937	101491	585539	10
51	17107	98526	17363	575941	101496	584558	9
52	17136	98521	17393	574949	101501	583581	8
53	17165	98516	17423	573960	101506	582606	7
54	17193	98511	17453	572974	101512	581635	6
55	17222	98506	17483	571992	101517	580667	5
56	17250	98501	17513	571013	101522	579703	4
57	17279	98496	17543	570037	101527	578742	3
58	17308	98491	17573	569064	101532	577783	2
59	17336	98486	17603	568094	101537	576829	1
60	17365	98481	17633	567128	101543	575877	0

10	Sinuum		Tangentiū		Secantium		
0	17365	98481	17633	567129	101543	575877	60
1	17392	98476	17663	566165	101548	574929	59
2	17422	98471	17693	565205	101553	573984	58
3	17451	98466	17723	564249	101558	573041	57
4	17479	98461	17753	563295	101564	572102	56
5	17508	98455	17783	562344	101569	571167	55
6	17537	98450	17813	561392	101574	570234	54
7	17565	98445	17843	560452	101579	569304	53
8	17594	98440	17873	559511	101585	568377	52
9	17623	98435	17903	558573	101590	567454	51
10	17651	98430	17933	557638	101595	566533	50
11	17680	98425	17963	556705	101601	565615	49
12	17708	98420	17993	555776	101606	564701	48
13	17737	98414	18023	554850	101611	563789	47
14	17766	98409	18053	553926	101616	562881	46
15	17794	98404	18083	553007	101622	561975	45
16	17823	98399	18113	552090	101627	561073	44
17	17852	98394	18143	551175	101633	560173	43
18	17880	98389	18173	550264	101638	559277	42
19	17909	98383	18203	549356	101643	558383	41
20	17937	98378	18233	548450	101649	557492	40
21	17966	98373	18263	547548	101654	556604	39
22	17995	98368	18293	546648	101659	555719	38
23	18023	98362	18323	545751	101665	554837	37
24	18052	98357	20353	544857	101670	553958	36
25	18081	98352	20384	543966	101676	553081	35
26	18109	98347	20414	543077	101681	552208	34
27	18138	98341	20444	542192	101687	551337	33
28	18166	98336	20474	541309	101692	550468	32
29	18195	98331	20504	540429	101698	549603	31
30	18224	98325	20534	549552	101703	548741	30

10	Sinuum		Tangentiū		Secantium		
30	18224	98325	18534	539552	101703	548741	30
31	18252	98321	18564	538677	101709	547881	29
32	18281	98315	18594	537806	101714	547027	28
33	18309	98310	18624	536936	101720	546169	27
34	18338	98304	18654	536070	101725	545317	26
35	18367	98299	18684	535206	101731	544468	25
36	18395	98294	18714	534345	101736	543622	24
37	18424	98288	18745	533487	101742	542778	23
38	18452	98283	18775	532631	101747	541937	22
39	18481	98277	18805	531778	101753	541099	21
40	18509	98272	18835	530928	101758	540262	20
41	18538	98267	18865	530080	101764	539430	19
42	18567	98261	18895	529235	101769	538600	18
43	18595	98256	18925	528393	101775	537772	17
44	18624	98250	18955	527553	101781	536947	16
45	18652	98245	18986	526715	101786	536124	15
46	18681	98240	19016	525880	101792	535304	14
47	18710	98234	19046	525048	101798	534486	13
48	18738	98229	19076	524219	101803	533671	12
49	18767	98223	19106	523391	101809	532859	11
50	18795	98218	19136	522567	101815	532049	10
51	18823	98212	19166	521745	101820	531243	9
52	18852	98207	19197	520925	101826	530436	8
53	18881	98201	19227	520108	101832	529634	7
54	18910	98196	19257	519293	101837	528834	6
55	18938	98190	19287	518481	101843	528036	5
56	18967	98185	19317	517671	101849	527241	4
57	18995	98179	19347	516863	101855	526448	3
58	19024	98174	19378	516058	101860	525658	2
59	19052	98168	19408	515256	101866	524870	1
60	19081	98163	19438	514455	101872	524084	0

II	Sinuum		Tangentiū		Secantium		
0	19081	98163	19438	514455	101872	524084	60
1	19109	98157	19468	513658	101877	523301	59
2	19138	98152	19498	512862	101883	522521	58
3	19167	98146	19529	512069	101889	521742	57
4	19195	98140	19559	511279	101895	520966	56
5	19224	98135	19589	510490	101901	520193	55
6	19252	98129	19619	509704	101906	519421	54
7	19281	98124	19649	508921	101912	518652	53
8	19309	98118	19680	508139	101918	517886	52
9	19338	98112	19710	507360	101924	517121	51
10	19366	98107	19740	506584	101930	516359	50
11	19395	98101	19770	505809	101936	515599	49
12	19423	98096	19801	505037	101941	514842	48
13	19452	98090	19831	504267	101947	514087	47
14	19481	98084	19861	503499	101953	513334	46
15	19509	98079	19892	502734	101959	512583	45
16	19538	98073	19921	501971	101965	511835	44
17	19566	98067	19952	501210	101971	511088	43
18	19595	98061	19982	500451	101977	510344	42
19	19623	98056	20012	499695	101983	509602	41
20	19652	98050	20042	498940	101989	508863	40
21	19680	98044	20073	498188	101995	508125	39
22	19709	98039	20103	497438	102001	507390	38
23	19737	98033	20133	496690	102007	506657	37
24	19766	98027	20164	495945	102013	505926	36
25	19794	98021	20194	495201	102019	505197	35
26	19823	98016	20224	494460	102025	504471	34
27	19851	98010	20254	493721	102031	503746	33
28	19880	98004	20285	492984	102037	503024	32
29	19903	97998	20315	492249	102043	502303	31
30	19937	97992	20345	491516	102049	501585	30

II	Sinuum		Tangentiū		Secantium		
30	19937	97992	20345	491516	102049	501585	30
31	19965	97987	20376	490785	102055	500869	29
32	19994	97981	20406	490056	102061	500155	28
33	20022	97975	20436	489330	102067	499443	27
34	20051	97969	20466	488605	102073	498733	26
35	20079	97963	20497	487882	102079	498025	25
36	20108	97958	20527	487162	102085	497320	24
37	20136	97952	20557	486444	102091	496616	23
38	20165	97946	20588	485727	102097	495914	22
39	20193	97940	20618	485013	102103	495215	21
40	20222	97934	20648	484300	102110	494517	20
41	20250	97928	20679	483590	102116	493821	19
42	20279	97922	20709	482882	102122	493128	18
43	20307	97916	20739	482175	102128	492436	17
44	20336	97910	20770	481471	102134	491746	16
45	20364	97905	20800	480769	102140	491058	15
46	20393	97899	20830	480068	102146	490373	14
47	20421	97893	20861	479370	102153	489689	13
48	20450	97887	20891	478673	102159	489007	12
49	20478	97881	20921	477978	102165	488327	11
50	20507	97875	20952	477286	102171	487649	10
51	20535	97869	20982	476595	102178	486973	9
52	20564	97863	21013	475906	102184	486299	8
53	20592	97857	21043	475219	102190	485627	7
54	20620	97851	21073	474534	102196	484956	6
55	20649	97845	21104	473851	102203	484288	5
56	20677	97839	21134	473169	102209	483621	4
57	20706	97833	21164	472490	102215	482956	3
58	20734	97827	21195	471813	102221	482294	2
59	20763	97821	21226	471137	102228	481633	1
60	20791	97815	21256	470463	102234	480973	0

12	Sinuum		Tangentiū		Secantium		
0	20791	97815	21256	570463	102234	480973	60
1	20820	97809	21286	469791	102241	480316	59
2	20848	97803	21316	469121	102247	479661	58
3	20877	97797	21347	468452	102253	479007	57
4	20905	97790	21377	467786	102259	478355	56
5	20933	97784	21408	467121	102266	477705	55
6	20962	97778	21438	466458	102272	477057	54
7	20991	97772	21469	465797	102279	476410	53
8	21019	97766	21499	465138	102285	475766	52
9	21047	97760	21529	464480	102291	475123	51
10	21076	97754	21560	463824	102298	474482	50
11	21104	97748	21590	463170	102304	473843	49
12	21132	97742	21621	462518	102311	473205	48
13	21161	97735	21651	461868	102317	472569	47
14	21189	97729	21682	461219	102323	471935	46
15	21218	97723	21712	460572	102330	471303	45
16	21247	97717	21743	459927	102336	470672	44
17	21275	97711	21773	459283	102343	470044	43
18	21303	97705	21804	458641	102349	469417	42
19	21331	97698	21834	458001	102356	468791	41
20	21360	97692	21864	457363	102362	468168	40
21	21388	97686	21895	456726	102369	467546	39
22	21417	97680	21925	456091	102375	466925	38
23	21445	97673	21956	455458	102382	466307	37
24	21474	97667	21986	454826	102388	465690	36
25	21502	97661	22017	454196	102395	465074	35
26	21530	97655	22047	453568	102402	464461	34
27	21559	97649	22078	452941	102408	463849	33
28	21587	97642	22108	452316	102415	463238	32
29	21616	97636	22139	451693	102421	462630	31
30	21644	97630	22169	451071	102428	462023	30

12	Sinuum		Tangentiū		Secantium		
30	21644	97630	22169	451071	102428	462023	30
31	21672	97623	22200	450451	102435	461417	29
32	21701	97617	22231	449832	102441	460813	28
33	21729	97612	22261	449215	102448	460211	27
34	21758	97604	22292	448600	102454	459611	26
35	21786	97598	22322	447986	102461	459012	25
36	21814	97592	22353	447374	102468	458414	24
37	21843	97585	22383	446764	102474	457819	23
38	21871	97579	22414	446155	102481	457224	22
39	21899	97573	22444	445547	102488	456632	21
40	21928	97566	22475	444942	102494	456041	20
41	21956	97560	22505	444338	102501	455451	19
42	21985	97553	22536	443735	102508	454863	18
43	22013	97547	22567	443134	102515	454277	17
44	22041	97541	22597	442534	102521	453692	16
45	22070	97534	22628	441936	102528	453109	15
46	22098	97528	22658	441340	102535	452527	14
47	22126	97521	22689	440745	102542	451947	13
48	22154	97515	22719	440152	102548	451368	12
49	22183	97508	22750	439560	102555	450791	11
50	22212	97502	22781	438969	102562	450216	10
51	22240	97496	22811	438381	102569	449642	9
52	22268	97489	22842	437793	102576	449069	8
53	22297	97483	22872	437207	102582	448498	7
54	22325	97476	22903	436623	102589	447928	6
55	22353	97470	22934	436040	102596	447360	5
56	22382	97463	22963	435459	102603	446793	4
57	22410	97457	22995	434879	102610	446228	3
58	23438	97450	22926	434300	102617	445664	2
59	22467	97444	23056	433723	102624	445102	1
60	22495	97437	23087	433147	102630	444541	0

13	Sinuum		Tangentiũ		Secantium		
0	22495	97437	23087	433148	102630	444541	60
1	22523	97430	23117	432573	102637	443982	59
2	22552	97424	23148	432001	102644	443424	58
3	22580	97417	23179	431430	102651	442867	57
4	22608	97411	23209	430860	102658	442312	56
5	22637	97404	23240	430291	102665	441759	55
6	22665	97398	23271	429724	102672	441206	54
7	22693	97391	23301	429159	102679	440656	53
8	22722	97384	23332	428595	102686	440106	52
9	22750	97378	23363	428032	102693	439558	51
10	22778	97371	23393	427471	102700	439012	50
11	22807	97365	23424	426911	102707	438466	49
12	22835	97358	23455	426352	102714	437923	48
13	22863	97351	23485	425796	102721	437380	47
14	22892	97345	23516	425239	102728	436839	46
15	22920	97338	23578	424685	102735	436300	45
16	22948	97331	23578	424132	102742	435761	44
17	22977	97325	23607	423580	102749	435224	43
18	23005	97318	23639	423030	102756	434685	42
19	23033	97311	23670	422481	102763	434154	41
20	23062	97304	23700	421933	102770	433622	40
21	23090	97298	23731	421387	102777	433090	39
22	23118	97291	23762	420842	102780	432825	38
23	23146	97284	23793	420298	102799	432031	37
24	23175	97278	23823	419756	102799	431503	36
25	23203	97271	23854	419215	102806	430977	35
26	23231	97264	23885	418675	102813	430452	34
27	23260	97257	23916	418137	102820	429929	33
28	23288	97251	23946	417600	102827	429406	32
29	23316	97244	23977	417064	102834	428885	31
30	23345	97237	24008	416530	102842	428366	30

13	Sinuum		Tangentiū		Secantium		
30	23345	97237	24008	416530	102842	428366	30
31	23373	97230	24039	415997	102849	427847	29
32	23340	97223	24069	415465	102856	427330	28
33	23429	97217	24100	414934	102863	426814	27
34	23458	97210	24131	414405	102870	426300	26
35	23486	97204	24162	413877	102878	425787	25
36	23514	97196	24193	413350	102885	425275	24
37	23542	97189	24223	412825	102892	424764	23
38	23571	97182	24254	412301	102899	424255	22
39	23599	97176	24285	411778	102907	423746	21
40	23627	97169	24316	411256	102914	423239	20
41	23656	97162	24347	410736	102921	422734	19
42	23684	97155	24377	410216	102928	422229	18
43	23712	97148	24408	409699	102936	421726	17
44	23740	97141	24439	409182	102943	421224	16
45	23769	97134	24470	408667	102950	420723	15
46	23797	97127	24501	408152	102958	420224	14
47	23825	97120	24532	407639	102965	419725	13
48	23853	97113	24562	407127	102972	419228	12
49	23882	97106	24593	406616	102980	418733	11
50	23910	97100	24624	406107	102987	418238	10
51	23938	97093	24655	405599	102994	417744	9
52	23966	97086	24686	405092	103002	417252	8
53	23995	97079	24717	404586	103009	416761	7
54	24023	97072	24747	404081	103017	416271	6
55	24051	97065	24778	403578	103024	415782	5
56	24079	97058	24809	403076	103032	415295	4
57	24108	97051	24840	402574	103039	414809	3
58	24136	97044	24871	402074	103046	414323	2
59	24164	97037	24902	401576	103054	413839	1
60	24192	97030	24933	401078	103061	413357	0

14	Sinuum		Tangentiū		Secantium		
0	24192	97030	24933	401078	103061	413357	60
1	24220	97023	24963	400581	103069	412874	59
2	24249	97015	24995	400086	103076	412394	58
3	24277	97008	25026	399592	103084	411915	57
4	24305	97001	25056	399099	103091	411437	56
5	24333	96994	25087	398607	103099	410960	55
6	24361	96987	25118	398117	103106	410484	54
7	24390	96980	25149	397627	103114	410009	53
8	24418	96973	25180	397139	103121	409535	52
9	24446	96966	25211	396651	103129	409063	51
10	24474	96959	25242	396165	103137	408591	50
11	24503	96952	25273	395680	103144	408121	49
12	24531	96945	25304	395196	103152	407652	48
13	24559	96937	25335	394713	103159	407184	47
14	24587	96930	25366	394232	103167	406717	46
15	24615	96923	25397	393751	103175	406251	45
16	24644	96916	25428	393271	103182	405786	44
17	24672	96909	25459	392793	103190	405322	43
18	24700	96902	25490	392316	103197	404860	42
19	24728	96894	25521	391839	103205	404398	41
20	24756	96887	25552	391364	103213	403938	40
21	24784	96880	25583	390890	103220	403479	39
22	24813	96873	25614	390417	103228	403020	38
23	24841	96866	25645	389945	103236	402563	37
24	24869	96858	25676	389474	103244	402107	36
25	24897	96851	25707	389004	103251	401652	35
26	24925	96844	25738	388536	103259	401198	34
27	24954	96837	25769	388068	103267	400745	33
28	24982	96829	25800	387601	103275	400293	32
29	25010	96822	25831	387136	103281	399843	31
30	25038	96815	25862	386671	103288	399393	30

14	Sinuum		Tangentiū		Secantium		
30	25038	96815	25862	386671	103298	399393	30
31	25066	96807	25893	386208	103298	398944	29
32	25094	96800	25924	385745	103306	398497	28
33	25122	96793	25955	385284	103313	397050	27
34	25151	96786	25986	384824	103321	397604	26
35	25179	96778	26017	384364	103329	397160	25
36	25207	96771	26048	383906	103337	396716	24
37	25235	96764	26079	383449	103345	396274	23
38	25263	96756	26110	382992	103353	395832	22
39	25291	96749	26141	382537	103360	395392	21
40	25320	96742	26172	382083	103368	394952	20
41	25348	96734	26203	381630	103376	394514	19
42	25376	96727	26235	381027	103384	394076	18
43	25404	96719	26266	380726	103392	393640	17
44	25432	96712	26297	380276	103400	393204	16
45	25460	96705	26328	379827	103408	392770	15
46	25488	96697	26359	379378	103416	392337	14
47	25516	96690	26390	378931	103424	391904	13
48	25545	96682	26421	378485	103432	391473	12
49	25573	96675	76452	378040	103439	391042	11
50	25601	96667	26483	377595	103447	390613	10
51	25629	96660	26515	377152	103455	380184	9
52	25657	96653	26546	376709	103463	389756	8
53	25685	96645	26577	376268	103471	389330	7
54	25713	96638	26608	375828	103479	388904	6
55	25741	96630	26639	375388	103487	388479	5
56	25769	96623	26670	374950	103495	388056	4
57	25798	96615	26701	374512	103503	387633	3
58	25826	96608	26733	374075	103511	387211	2
59	25854	96600	26764	373640	103520	386790	1
60	25882	96593	26795	373205	103528	386370	0

15	Sinuum		Tangentiũ		Secantium		
0	25882	96593	26795	373205	103528	386370	60
1	25910	96585	26826	372771	103536	385951	59
2	25938	96578	26857	372338	103544	385533	58
3	25966	96570	26888	371907	103552	385116	57
4	25994	96562	26920	371476	103560	384700	56
5	26022	96555	26951	371046	103568	384285	55
6	26050	96547	26982	370616	103576	383871	54
7	26080	96540	27013	370188	103584	383457	53
8	26107	96532	27044	369761	103592	383045	52
9	26135	96524	27076	369335	103601	382633	51
10	26163	96517	27107	368909	103609	382223	50
11	26191	96509	27138	368485	103617	381813	49
12	26219	96502	27169	368061	103625	381404	48
13	26247	96494	27201	367638	103633	380996	47
14	26275	96487	27232	367217	103642	380589	46
15	26302	96477	27263	366796	103650	380183	45
16	26331	96471	27294	366376	103658	379778	44
17	26359	96463	27326	365957	103666	379374	43
18	26387	96456	27357	365538	103674	378970	42
19	26415	96448	27388	365121	103683	378568	41
20	26443	96440	27419	364705	103691	378166	40
21	26471	96433	27451	364289	103699	377765	39
22	26500	96425	27482	363874	103708	377365	38
23	26528	96417	27513	363461	103716	376966	37
24	26556	96410	27545	363048	103724	376568	36
25	26584	96402	27576	362636	103732	376171	35
26	26612	96394	27607	362224	103741	375775	34
27	26640	96386	27638	361814	103749	375379	33
28	26668	96379	27670	361405	103757	374984	32
29	26696	96371	27701	360996	103766	374591	31
30	26724	96363	27732	360588	103774	374198	30

15	Sinuum		Tangentiũ		Secantium		
30	26724	96363	27732	360588	103774	374118	30
31	26752	96355	27764	360182	103783	373806	29
32	26,80	96347	27795	359775	103791	373411	28
33	26808	96340	27826	359370	103799	373024	27
34	26836	96332	27858	358966	103808	372635	26
35	26864	96324	27889	358562	103816	372240	25
36	26892	96316	27920	358160	103825	371858	24
37	26920	96308	27952	357758	103833	371471	23
38	26948	96301	27983	357357	103842	371085	22
39	26976	96293	28015	356957	103850	370699	21
40	27004	96285	28046	356557	103858	370315	20
41	27032	96277	28077	356159	103867	369931	19
42	27060	96269	28109	355761	103875	369548	18
43	27088	96261	28140	355364	103884	369166	17
44	27116	96253	28172	354968	103892	368785	16
45	27144	96246	28203	354573	103901	368405	15
46	27172	96238	28234	354179	103909	368025	14
47	27200	99230	28266	353785	103918	367647	13
48	27228	96222	28297	353393	103927	367269	12
49	27256	96214	28329	353001	103935	366892	11
50	27284	96206	28360	352609	103944	366515	10
51	27312	96198	28391	352219	103952	366140	9
52	27340	96190	28423	351830	103961	365765	8
53	27368	96182	28454	351441	103969	365391	7
54	27396	96174	28486	351053	103978	365018	6
55	27424	96166	28517	350666	103987	364646	5
56	27452	96158	28549	350279	103995	364274	4
57	27480	96150	28580	349894	104004	363903	3
58	27508	96142	28612	349509	104013	363533	2
59	27536	96134	28643	349125	104021	363164	1
60	27564	96126	28675	348742	104030	362796	0

16	Sinuum		Tangentiũ		Secantium		
0	27564	96126	28675	348742	104030	362796	60
1	27592	96118	28706	348359	104039	362428	59
2	27620	96110	28737	347977	104047	362061	58
3	27648	96102	28769	347596	104056	361695	57
4	27676	96098	28800	347216	104065	361330	56
5	27704	96086	28832	346837	104073	360965	55
6	27731	96078	28863	346458	104082	360601	54
7	27760	96070	28895	346080	104091	360238	53
8	27787	96062	28927	345703	104100	359876	52
9	27815	96054	28958	345327	104108	359515	51
10	27843	96046	28990	344951	104117	359154	50
11	27871	96037	29021	344576	104126	358794	49
12	27899	96029	29053	344202	104135	358435	48
13	27927	96021	29084	343829	104144	358076	47
14	27955	96013	29116	343456	104152	357718	46
15	27983	96005	29147	343085	104161	357361	45
16	28011	95997	29179	342713	104170	357005	44
17	28039	95989	29210	342343	104179	356649	43
18	28067	95981	29242	341973	104188	356295	42
19	28095	95972	29274	341605	104197	355941	41
20	28123	95964	29305	341236	104206	355587	40
21	28150	95956	29337	340869	104214	355235	39
22	28178	95948	29368	340502	104223	354883	38
23	28206	95940	29400	340136	104232	354532	37
24	28234	95931	29432	339771	104241	354181	36
25	28262	95923	29463	339406	104250	353831	35
26	28290	95915	29495	339043	104259	353482	34
27	28318	95907	29526	338679	104268	353134	33
28	28346	95898	29558	338317	104277	352787	32
29	28374	95890	29590	337955	104286	352440	31
30	28401	95882	29621	337594	104295	352094	30

16	Sinuum		Tangentiū		Secantium		
30	28401	95882	29621	337594	104295	352094	30
31	28429	95874	29653	337234	104304	351748	29
32	28457	95865	29685	336875	104313	351404	28
33	28485	95857	29716	336516	104322	351060	27
34	28513	95849	29748	336157	104331	350716	26
35	28541	95841	29780	335800	104340	350374	25
36	28569	95832	29811	335443	104349	350032	24
37	28597	95824	29843	335087	104358	349691	23
38	28625	95816	29875	334732	104367	349350	22
39	28652	95807	29906	334377	104376	349010	21
40	28680	95799	29938	334023	104385	348671	20
41	28708	95791	29970	333670	104394	348333	19
42	28736	95782	30001	333317	104403	347995	18
43	28764	95774	30033	332965	104413	347658	17
44	28792	95766	30065	332614	104422	347321	16
45	28820	95757	30097	332264	104431	346986	15
46	28847	95749	30128	331914	104440	346651	14
47	28875	95740	30160	331564	104449	346316	13
48	28903	95732	30192	331216	104458	345983	12
49	28931	95724	30224	330868	104467	345650	11
50	28959	95715	30255	330521	104477	345317	10
51	28987	95707	30287	330174	104486	344986	9
52	29015	95698	30319	329828	104495	344655	8
53	29042	95690	30351	329483	104504	344324	7
54	29070	95681	30382	329139	104514	343995	6
55	29098	95673	30414	328795	104523	343666	5
56	29126	95664	30446	328452	104532	343337	4
57	29154	95656	30478	328109	104541	343009	3
58	29182	95648	30509	327767	104551	342682	2
59	29210	95639	30541	327426	104560	342356	1
60	29237	95630	30573	327085	104569	342030	0

17	Sinuum		Tangentiũ		Secantium		
0	29237	95630	30573	327085	104569	342030	60
1	29265	95622	30605	326745	104578	341705	59
2	29293	95613	30637	326406	104588	341381	58
3	29321	95605	30669	326067	104597	341057	57
4	29348	95596	30700	325729	104606	340734	56
5	29376	95588	30732	325392	104616	340411	55
6	29404	95579	30764	325055	104625	340089	54
7	29432	95571	30796	324719	104635	339768	53
8	29460	95562	30828	324383	104644	339448	52
9	29487	95554	30860	324049	104653	339128	51
10	29515	95545	30891	323714	104663	338808	50
11	29543	95536	30923	323381	104672	338489	49
12	29571	95528	30955	323048	104682	338171	48
13	29599	95519	30987	322715	104691	337854	47
14	29626	95511	31019	322383	104700	337537	46
15	29654	95502	31051	322052	104710	337221	45
16	29682	95493	31083	321722	104719	336905	44
17	29710	95485	31115	321392	104729	336590	43
18	29737	95476	31147	321063	104738	336276	42
19	29765	95467	31178	320734	104748	335962	41
20	29793	95459	31210	320406	104757	335649	40
21	29821	95450	31242	320079	104767	335336	39
22	29849	95441	31274	319752	104776	335024	38
23	29876	95433	31306	319426	104786	334713	37
24	29904	95424	31338	319100	104795	334402	36
25	29932	95415	31370	318775	104805	334092	35
26	29960	95407	31402	318451	104815	333783	34
27	29987	95398	31434	318127	104824	333474	33
28	30015	95389	31466	317804	104834	333166	32
29	30043	95380	31498	317481	104843	332858	31
30	30071	95372	31530	317159	104853	332551	30

17	Sinuum		Tangentiũ		Secantium		
30	30071	95372	31530	317159	104853	332551	30
31	30098	95363	31562	316838	104863	332244	29
32	30126	95354	31594	316517	104872	331939	28
33	30154	95345	31626	316197	104882	331633	27
34	30182	95337	31658	315877	104891	331328	26
35	30209	95328	31690	315558	104901	331024	25
36	30237	95319	31722	315240	104911	330721	24
37	30265	95310	31754	314922	104920	330418	23
38	30292	95301	31786	314605	104930	330115	22
39	30320	95293	31818	314288	104940	329814	21
40	30348	95284	31850	313972	104950	329512	20
41	30376	95275	31882	313656	104959	329212	19
42	30403	95266	31914	313341	104969	328912	18
43	30431	95257	31946	313027	104979	328612	17
44	30459	95248	31978	312713	104989	328313	16
45	30486	95240	32010	312400	104998	328015	15
46	30514	95231	32042	312087	105008	327717	14
47	30542	95222	32074	311775	105018	327420	13
48	30570	95213	32106	311464	105028	327123	12
49	30597	95204	32139	311153	105038	326827	11
50	30625	95295	32171	310842	105047	326531	10
51	30652	95186	32203	310532	105057	326237	9
52	30680	95177	32235	310223	105067	325942	8
53	30708	95168	32267	309914	105077	325648	7
54	30736	95159	32299	309606	105087	325355	6
55	30763	95150	32331	309298	105097	325062	5
56	30791	95142	32363	308991	105107	324770	4
57	30819	95133	32396	308685	105116	324478	3
58	30846	95124	32427	308379	105126	324187	2
59	30874	95115	32460	308073	105136	323897	1
60	30902	95106	32492	307768	105146	323607	0

18	Sinuum		Tangentiū		Secantium		
0	30902	95106	32492	307768	105146	323607	60
1	30929	95097	32524	307464	105156	323317	59
2	30957	95088	32556	307160	105166	323028	58
3	30985	95079	32588	306857	105176	322740	57
4	31012	95070	32621	306554	105186	322452	56
5	31040	95061	32653	306252	105196	322165	55
6	31068	95052	32685	305950	105206	321878	54
7	31095	95043	32717	305649	105216	321592	53
8	31123	95033	32749	305349	105226	321306	52
9	31151	95024	32782	305049	105236	321021	51
10	31178	95015	32814	304749	105246	320737	50
11	31206	95006	32846	304450	105256	320453	49
12	31233	94997	32878	304152	105266	320169	48
13	31261	94988	32911	303854	105276	319886	47
14	31289	94979	32943	303556	105286	319604	46
15	31316	94970	32975	303259	105297	319322	45
16	31344	94961	33007	302963	105307	319040	44
17	31372	94952	33040	302667	105317	318759	43
18	31399	94943	33072	302372	105327	318479	42
19	31427	94933	33104	302077	105337	318199	41
20	31454	94924	33136	301783	105347	317920	40
21	31482	94915	33169	301489	105357	317641	39
22	31510	94906	33201	301196	105367	317363	38
23	31537	94897	33233	300903	105378	317085	37
24	31565	94888	33266	300611	105388	316808	36
25	31593	94878	33298	300319	105398	316531	35
26	31620	94869	33330	300028	105408	316255	34
27	31648	94860	33363	299738	105418	315979	33
28	31675	94851	33395	299447	105429	315703	32
29	31703	94842	33427	299158	105439	315429	31
30	31730	94832	33460	298868	105449	315154	30

18	Sinuum		Tangentiū		Secantium		
30	31730	94832	33460	298868	105449	315154	30
31	31758	94823	33492	298580	105459	314881	29
32	31786	94814	33524	298292	105470	314607	28
33	31813	94805	33557	298004	105480	314335	27
34	31841	94795	33589	297717	105490	314062	26
35	31868	94786	33621	297430	105501	313791	25
36	31896	94777	33654	297144	105511	313519	24
37	31924	94768	33686	296858	105521	313249	23
38	31951	94758	33719	296573	105532	312978	22
39	31979	94749	33751	296288	105542	312709	21
40	32006	94740	33783	296004	105552	312439	20
41	32034	94730	33816	295720	105563	312170	19
42	32061	94721	33848	295437	105573	311902	18
43	32089	94712	33881	295154	105584	311635	17
44	32116	94702	33913	294872	105594	311367	16
45	32144	94693	33945	294590	105604	311100	15
46	32171	94684	33978	294309	105615	310834	14
47	32199	94674	34010	294028	105625	310568	13
48	32227	94665	34043	293748	105636	310303	12
49	32254	94656	34075	293468	105646	310038	11
50	32282	94646	34108	293189	105657	309773	10
51	32309	94637	34140	292910	105667	309510	9
52	32337	94627	34173	292631	105678	309246	8
53	32364	94618	34205	292353	105688	308983	7
54	32392	94609	34238	292076	105699	308721	6
55	32419	94599	34270	291799	105709	308458	5
56	32447	94590	34303	291522	105720	308197	4
57	32474	94581	34335	291246	105730	307936	3
58	32502	94571	34368	290971	105741	307675	2
59	32529	94561	34400	290696	105751	307415	1
60	32557	94552	34433	290421	105762	307155	0

19	Sinuum		Tangentium		Secantium		
0	32557	94552	34433	290421	105762	307155	60
1	32584	94542	34466	290147	105773	306896	59
2	32612	94533	34498	289873	105783	306637	58
	32639	94523	34530	289600	105794	306379	57
4	32667	94514	34563	289327	105805	306121	56
5	32694	94504	34596	289055	105815	305864	55
6	32722	94495	34628	288783	105826	305607	54
7	32749	94485	34661	288511	105836	305350	53
8	32777	94476	34693	288240	105847	305094	52
9	32804	94466	34726	287970	105858	304839	51
10	32832	94457	34758	287700	105869	304584	50
11	32859	94447	34791	287430	105879	304329	49
12	32887	94438	34824	287161	105890	304075	48
13	32914	94428	34856	286892	105901	303821	47
14	32942	94418	34889	286624	105911	303568	46
15	32969	94409	34922	286356	105922	303315	45
16	32997	94399	34954	286089	105933	303062	44
17	33024	94390	34987	285822	105944	302810	43
18	33051	94380	35019	285555	105955	302559	42
19	33079	94370	35052	285289	105965	302308	41
20	33106	94361	35085	285023	105976	302057	40
21	33134	94351	35117	284758	105987	301807	39
22	33161	94342	35150	284494	105998	301557	38
23	33189	94332	35183	284229	106009	301308	37
24	33216	94322	35216	283965	106019	301059	36
25	33244	94313	35248	283702	106030	300810	35
26	33271	94303	35281	283439	106041	300562	34
27	33298	94293	35314	283176	106052	300315	33
28	33326	94284	35346	282915	106063	300067	32
29	33353	94274	35379	282653	106074	299821	31
30	33381	94264	35412	282391	106085	299574	30

19	Sinuu		Tangentiũ		Secantium		
30	33381	94254	35412	282391	106098	299574	30
31	33408	94254	35445	282130	106096	299328	29
32	33436	94245	35477	281870	106107	299083	28
33	33463	94235	35510	281610	106118	298837	27
34	33490	94225	35543	281350	106123	298593	26
35	33518	94216	35576	281091	106140	298349	25
36	33545	94206	35608	280833	106151	298106	24
37	33573	94196	35641	280574	106162	297862	23
38	33600	94186	35674	280316	106173	297619	22
39	33627	94176	35707	280059	106184	297377	21
40	33655	94167	35740	279802	106195	297135	20
41	33682	94157	35772	279545	106206	296893	19
42	33710	94147	35805	279289	106217	296652	18
43	33737	94137	35838	279033	106228	296411	17
44	33764	94127	35871	278778	106239	296171	16
45	33792	94118	35904	278523	106250	295931	15
46	33819	94108	35937	278269	106261	295691	14
47	33846	94098	35969	278014	106272	295452	13
48	33874	94088	36002	277761	106283	295213	12
49	33901	94078	36035	277507	106295	294975	11
50	33929	94068	36068	277255	106306	294737	10
51	33956	94058	36101	277002	106317	294500	9
52	33983	94049	36134	276750	106328	294263	8
53	34011	94039	36167	276498	106389	294026	7
54	34038	94029	36199	276247	106350	293790	6
55	34065	94019	36232	275996	106362	293554	5
56	34093	94009	36265	275746	106373	293318	4
57	34120	93999	36298	275496	106384	293083	3
58	34147	93989	36331	275246	106395	292849	2
59	34175	93979	36364	274997	106407	292614	1
60	34202	93969	36397	274748	106418	292380	0

20	Sinuum		Tangentiū		Secantium		
0	34202	93969	36397	274748	106418	292380	60
1	34229	93959	36430	274499	106429	292147	59
2	34257	93949	36463	274251	106440	291914	58
3	34284	93939	36496	274003	106452	291681	57
4	34311	93929	36529	273756	106463	291449	56
5	34339	93919	36562	273509	106474	291217	55
6	34366	93909	36595	273263	106486	290985	54
7	34393	93899	36628	273017	106497	290754	53
8	34421	93889	36661	272771	106508	290524	52
9	34448	93879	36694	272526	106520	290293	51
10	34475	93869	36727	272281	106531	290063	50
11	34503	93859	36760	272036	106542	289834	49
12	34530	93849	36793	271792	106554	289605	48
13	34557	93839	36826	271548	106565	289376	47
14	34584	93829	36859	271305	106577	289148	46
15	34612	93819	36892	271062	106588	288920	45
16	34639	93809	36925	270819	106600	288692	44
17	34666	93799	36958	270577	106611	288465	43
18	34694	93789	36991	270335	106622	288238	42
19	34721	93779	37024	270094	106634	288011	41
20	34748	93769	37057	269853	106645	287785	40
21	34775	93759	37090	269612	106657	287560	39
22	34803	93748	37123	269371	106668	287334	38
23	34830	93738	37157	269131	106680	287109	37
24	34857	93728	37190	268892	106691	286885	36
25	34885	93718	37223	268653	106703	286660	35
26	34912	93708	37256	268414	106715	286437	34
27	34939	93698	37289	268175	106726	286213	33
28	34966	93688	37322	267937	106738	285990	32
29	34993	93677	37355	267699	106749	285767	31
30	35021	93667	37388	267462	106761	285545	30

20	Sinuum		Tangentiũ		Secantium		
30	35021	93667	37388	267462	106761	285545	30
31	35048	93657	37423	267225	106773	285323	29
32	35075	93647	37455	266988	106784	285102	28
33	35102	93637	37488	266752	106796	284880	27
34	35130	93626	37521	266516	106807	284659	26
35	35157	93616	37554	266281	106819	284439	25
36	35184	93606	37588	266046	106831	284219	24
37	35211	93596	37621	265811	106842	283999	23
38	35239	93585	37654	265576	106854	283780	22
39	35266	93575	37687	265342	106866	283560	21
40	35293	93565	37720	265109	106878	283342	20
41	35320	93555	37754	264875	106889	283123	19
42	35347	93544	37786	264642	106901	282906	18
43	35375	93534	37820	264410	106913	282688	17
44	35402	93524	37853	264177	106925	282471	16
45	35429	93514	37887	263945	106936	282254	15
46	35456	93503	37920	263714	106948	282037	14
47	35483	93493	37953	263483	106960	281821	13
48	35511	93483	37986	263252	106972	281605	12
49	35538	93472	38020	263021	106984	281390	11
50	35565	93462	38053	262791	106995	281175	10
51	35592	93452	38086	262561	107007	280960	9
52	35619	93441	38120	262332	107019	280746	8
53	35647	93431	38153	262103	107031	280531	7
54	35674	93420	38186	261874	107043	280318	6
55	35701	93410	38220	261646	107055	280104	5
56	35728	93400	38253	261418	107067	279891	4
57	35755	93389	38286	261190	107079	279679	3
58	35782	93379	38320	260963	107091	279466	2
59	35810	93368	38353	260736	107103	279254	1
60	35837	93358	38386	260509	107114	279043	0

21	Sinuum		Tangentiũ		Secantium		
0	35837	93358	38386	260509	107114	279043	60
1	35864	93348	38420	260283	107126	278832	59
2	35891	93337	38453	260057	107139	278621	58
3	35918	93327	38487	259831	107150	278410	57
4	35945	93316	38520	259606	107162	278200	56
5	35973	93306	38553	259381	107174	277990	55
6	36000	93295	38587	259156	107186	277780	54
7	36027	93285	38620	258932	107198	277571	53
8	36054	93274	38654	258708	107211	277362	52
9	36081	93264	38687	258484	107223	277154	51
10	36108	93253	38721	258261	107235	276945	50
11	36135	93243	38754	258038	107247	276737	49
12	36162	93232	38787	257815	107259	276530	48
13	36190	93222	38821	257593	107271	276323	47
14	36217	93211	38854	257371	107283	276116	46
15	36244	93201	38888	257150	107295	275909	45
16	36271	93191	38921	256928	107307	275703	44
17	36298	93180	38955	256707	107320	275497	43
18	36325	93169	38988	256487	107332	275292	42
19	36352	93159	39022	256266	107344	275086	41
20	36379	93148	39055	256047	107356	274881	40
21	36406	93137	39089	255827	107368	274677	39
22	36434	93127	39122	255608	107380	274473	38
23	36461	93116	39156	255389	107393	274269	37
24	36488	93106	39190	255170	107405	274065	36
25	36515	93095	39223	254952	107417	273863	35
26	36542	93084	39257	254734	107429	273659	34
27	36569	93074	39290	254516	107442	273456	33
28	36596	93063	39324	254299	107454	273254	32
29	36623	93052	39357	254081	107466	273052	31
30	36650	93042	39391	253865	107479	272850	30

21	Sinuum		Tangentiū		Secantium.		
30	36650	93042	39391	253865	107479	272850	30
31	36677	93031	39425	253648	107491	272649	29
32	36704	93020	39458	253432	107503	272448	28
33	36731	93010	39492	253217	107516	272247	27
34	36758	92999	39526	253001	107528	272047	26
35	36785	92988	39559	252786	107540	271847	25
36	36812	92978	39593	252571	107553	271647	24
37	36840	92967	39626	252357	107565	271448	23
38	36867	92956	39660	252142	107578	271249	22
39	36894	92946	39694	251929	107590	271050	21
40	36921	92935	39727	251715	107602	270851	20
41	36948	92924	39761	251502	107615	270653	19
42	36975	92913	39795	251282	107627	270455	18
43	37002	92903	39829	251076	107640	270258	17
44	37029	92892	39862	250864	107652	270061	16
45	37056	92881	39896	250652	107665	269864	15
46	37083	92870	39930	250440	107677	269667	14
47	37110	92859	39963	250229	107690	269471	13
48	37137	92849	39997	250018	107702	269275	12
49	37164	92838	40031	249807	107715	269079	11
50	37191	92827	40065	249597	107727	268884	10
51	37218	92816	40098	249386	107740	268689	9
52	37245	92805	40132	249177	107752	268494	8
53	37272	92794	40166	248967	107765	268299	7
54	37299	92784	40200	248758	107778	268105	6
55	37326	92773	40234	248549	107790	267911	5
56	37353	92762	40267	248340	107803	267718	4
57	37380	92751	40301	248132	107815	267524	3
58	37407	92740	40335	247924	107828	267332	2
59	37434	92729	40369	247716	107841	267139	1
60	37461	92718	40403	247509	107853	266947	0

22	Sinuum		Tangentiū		Secantium		
0	37461	92718	40403	247509	107853	266947	60
1	37488	92707	40436	247302	107866	266755	59
2	37515	92697	40470	247095	107879	266563	58
3	37542	92686	40504	246888	107892	266371	57
4	37569	92675	40538	246682	107903	266180	56
5	37595	92664	40572	246476	107917	265989	55
6	37622	92653	40606	246270	107930	265798	54
7	37649	92642	40640	246065	107942	265609	53
8	37676	92631	40674	245860	107955	265419	52
9	37703	92620	40707	245655	107968	265230	51
10	37730	92609	40741	245451	107981	265040	50
11	37757	92598	40775	245246	107994	264851	49
12	37784	92587	40809	245043	108006	264662	48
13	37811	92576	40843	244839	108019	264473	47
14	37838	92565	40877	244636	108032	264285	46
15	37865	92554	40911	244433	108045	264097	45
16	37892	92543	40945	244230	108058	263909	44
17	37919	92532	40979	244027	108071	263722	43
18	37946	92521	41013	243825	108084	263535	42
19	37973	92510	41047	243623	108097	263348	41
20	37999	92499	41081	243422	108109	263162	40
21	38027	92488	41115	243220	108122	262976	39
22	38053	92477	41149	243019	108135	262790	38
23	38080	92466	41183	242819	108148	262604	37
24	38107	92455	41217	242618	108161	262419	36
25	38134	92444	41251	242418	108174	262234	35
26	38161	92432	41285	242218	108187	262049	34
27	38188	92421	41319	242018	108200	261864	33
28	38215	92410	41353	241819	108213	261680	32
29	38241	92399	41387	241620	108226	261496	31
30	38268	92388	41421	241421	108239	261313	30

22	Sinuum		Tangentiū		Secantium		
30	38268	92388	41421	241421	108239	261313	30
31	38295	92377	41455	241223	108252	261120	29
32	38322	92366	41490	241025	108265	260946	28
33	38349	92355	41524	240827	108278	260763	27
34	38376	92343	41558	240629	108291	260581	26
35	38403	92332	41592	240432	108305	260399	25
36	38430	92321	41626	240235	108318	260217	24
37	38456	92310	41660	240038	108331	260035	23
38	38483	92299	41694	239841	108344	259853	22
39	38510	92287	41728	239645	108357	259672	21
40	38537	92276	41763	239449	108370	259491	20
41	38564	92265	41797	239257	108383	259311	19
42	38591	92254	41831	239058	108397	259130	18
43	38617	92243	41865	238863	108410	258950	17
44	38644	92231	41899	238668	108423	258771	16
45	38671	92220	41933	238473	108436	258591	15
46	38698	92209	41968	238279	108449	258412	14
47	38725	92198	42002	238084	108463	258233	13
48	38752	92186	42036	237891	108476	258054	12
49	38778	92175	42070	237697	108489	257876	11
50	38805	92164	42105	237504	108503	257698	10
51	38832	92152	42139	237311	108516	257520	9
52	38859	92141	42173	237118	108529	257342	8
53	38886	92130	42207	236925	108542	257165	7
54	38912	92119	42242	236733	108556	256988	6
55	38939	92107	42276	236541	108569	256811	5
56	38966	92096	42310	236349	108582	256634	4
57	38993	92085	42345	236158	108596	256458	3
58	39020	92073	42379	235967	108609	256282	2
59	39046	92062	42413	235776	108623	256106	1
60	39073	92050	42447	235585	108636	255931	0

23	Sinuum		Tangentiū		Secantium		
0	39073	92050	42447	235585	108536	255931	60
1	39100	92039	42482	235395	108649	255755	59
2	39127	92028	42516	235205	108663	255580	58
3	39153	92016	42551	235015	108676	255406	57
4	39180	92005	42585	234825	108690	255230	56
5	39207	91994	42619	234636	108703	255057	55
6	39234	91982	42654	234447	108717	254883	54
7	39260	91971	42688	234258	108730	254709	53
8	39287	91959	42722	234069	108744	254536	52
9	39314	91948	42757	233881	108756	254362	51
10	39341	91936	42791	233693	108771	254190	50
11	39367	91925	42826	233505	108784	254017	49
12	39394	91914	42860	233317	108798	253844	48
13	39421	91902	42894	233130	108811	253672	47
14	39448	91891	42929	232943	108825	253500	46
15	39474	91879	42963	232756	108839	253328	45
16	39501	91868	42998	232570	108852	253157	44
17	39528	91856	43032	232383	108866	252986	43
18	39555	91845	43067	232197	108880	252815	42
19	39581	91833	43101	232012	108893	252645	41
20	39608	91822	43136	231826	108907	252474	40
21	39635	91810	43170	231641	108921	252304	39
22	39661	91799	43205	231456	108934	252134	38
23	39688	91787	43239	231271	108948	251965	37
24	39715	91775	43274	231086	108962	251795	36
25	39741	91764	43308	230902	108975	251626	35
26	39768	91752	43343	230718	108989	251457	34
27	39795	91741	43378	230534	109003	251289	33
28	39822	91729	43412	230351	109017	251120	32
29	39848	91718	43447	230167	109030	250952	31
30	39875	91706	43481	229984	119044	250784	30

23	Sinuum		Tangentiū		Secantium		
30	39875	91706	43481	229984	109044	250784	30
31	39902	91694	43516	229801	109058	250617	29
32	39928	91683	43550	229619	109072	250449	28
33	39955	91671	43585	229437	109086	250282	27
34	39982	91660	43620	229254	109099	250115	26
35	40008	91648	43654	229073	109113	249948	25
36	40035	91636	43689	228891	109127	249782	24
37	40062	61625	43724	228710	109141	249616	23
38	40088	91613	43758	228528	109155	249450	22
39	40115	91601	43793	228348	109169	249284	21
40	40141	91590	43828	228167	109183	249119	20
41	40168	91578	43862	227987	109197	248954	19
42	40195	91566	43897	227806	109211	248789	18
43	40221	91555	43932	227626	109224	248624	17
44	40248	91543	43966	227447	109238	248459	16
45	40275	91531	44001	227267	109252	248295	15
46	40301	91519	44036	227088	109266	248131	14
47	40328	91508	44071	226909	109280	247967	13
48	40355	91496	44105	226730	109294	247804	12
49	40381	91484	44140	226552	109308	247641	11
50	40408	91472	44175	226374	109322	247477	10
51	40434	91461	44210	226196	109337	247314	9
52	40461	91449	44244	226018	109351	247152	8
53	40488	91437	44279	225840	109365	246989	7
54	40514	91425	44313	225663	109379	246827	6
55	40541	91414	44349	225486	109393	246665	5
56	40567	91402	44384	225309	109407	246504	4
57	40594	91390	44418	225132	109421	246342	3
58	40620	91378	44453	224956	109435	246181	2
59	40647	91366	44488	224780	109449	246020	1
60	40674	91355	44523	224604	109464	245859	0

24	Sinuum		Tangentiũ		Secantium		
0	40674	91355	44523	224604	109464	245859	60
1	40700	91343	44558	224428	109478	245699	59
2	40727	91331	44593	224253	109492	245539	58
3	40753	91319	44627	224077	109507	245379	57
4	40780	91307	44662	223902	109520	245219	56
5	40806	91295	44697	223727	109535	245059	55
6	40833	91283	44732	223553	109549	244900	54
7	40860	91272	44767	223378	109563	244741	53
8	40886	91260	44802	223204	109577	244582	52
9	40913	91248	44837	223030	109592	244423	51
10	40939	91236	44872	222857	109606	244264	50
11	40966	91224	44907	222683	109620	244106	49
12	40992	91212	44942	222510	109635	243948	48
13	41019	91200	44977	222337	109649	243790	47
14	41045	91188	45012	222164	109663	243633	46
15	41072	91176	45047	221992	109678	243475	45
16	41098	91164	45082	221819	109692	243318	44
17	41125	91152	45117	221647	109707	243161	43
18	41151	91140	45152	221475	109721	243005	42
19	41178	91128	45187	221304	109735	242848	41
20	41204	91116	45222	221132	109750	242692	40
21	41231	91104	45257	220961	109764	242536	39
22	41257	91092	45292	220790	109779	242380	38
23	41284	91080	45327	220619	109793	242225	37
24	41310	91068	45362	220449	109808	242070	36
25	41337	91056	45397	220278	109822	241914	35
26	41363	91044	45432	220108	109837	241760	34
27	41390	91032	45467	219938	109851	241605	33
28	41416	91020	45502	219769	109866	241450	32
29	41443	91008	45538	219599	109880	241296	31
30	41469	90996	45573	219430	109895	241142	30

24	Sinuum		Tangentiũ		Secantium		
30	41469	90996	45573	219430	109895	241142	30
31	41496	90984	45608	219261	109909	240988	29
32	41522	90972	45643	219092	109924	240835	28
33	41549	90960	45678	218923	109939	240681	27
34	41575	90948	45713	218755	109953	240528	26
35	41602	90936	45748	218587	109968	240375	25
36	41628	90924	45784	218419	109982	240222	24
37	41655	90912	45819	218251	109997	240070	23
38	41681	90899	45854	218084	110012	239918	22
39	41707	90887	45889	217916	110026	239766	21
40	41734	90875	45924	217749	110041	239614	20
41	41760	90863	45960	217582	110056	239462	19
42	41787	90851	45995	217416	110071	239311	18
43	41813	90839	46030	217249	110085	239159	17
44	41840	90826	46065	217083	110100	239008	16
45	41866	90814	46101	216918	110115	238858	15
46	41892	90802	46136	216751	110130	238707	14
47	41919	90790	46171	216585	110144	238556	13
48	41945	90778	46207	216420	110159	238406	12
49	41972	90766	46242	216255	110174	238256	11
50	41998	90753	46277	216090	110189	238106	10
51	42024	90741	46312	215925	110204	237957	9
52	42051	90729	46348	215760	110219	237808	8
53	42077	90717	46383	215596	110233	237658	7
54	42104	90704	46418	215432	110248	237509	6
55	42130	90692	46454	215268	110263	237361	5
56	42156	90680	46489	215104	110278	237212	4
57	42183	90668	46525	214940	110293	237064	3
58	42209	90655	46560	214777	110308	236916	2
59	42235	90643	46595	214614	110323	236768	1
60	42262	90631	46631	214451	110338	236621	0

25	Sinuum		Tangentiū		Secantium		
0	42262	90631	46631	214451	110338	236621	60
1	42288	90618	46666	214288	110353	236473	59
2	42315	90606	46702	214125	110368	236325	58
3	42341	90594	46737	213963	110383	236178	57
4	42367	90582	46773	213801	110398	236031	56
5	42394	90569	46808	213639	110413	235886	55
6	42420	90557	46843	213477	110428	235738	54
7	42446	90545	46879	213316	110443	235592	53
8	42473	90532	46914	213154	110458	235446	52
9	42499	90520	46950	212993	110473	235300	51
10	42525	90507	46985	212832	110488	235154	50
11	42552	90495	47021	212671	110503	235009	49
12	42578	90483	47056	212511	110518	234863	48
13	42604	90470	47092	212350	110533	234718	47
14	42631	90458	47128	212190	110549	234574	46
15	42657	90446	47163	212030	110564	234429	45
16	42683	90433	47199	211871	110579	234284	44
17	42709	90421	47234	211711	110594	234140	43
18	42736	90408	47270	211552	110609	233996	42
19	42762	90396	47305	211392	110625	233852	41
20	42788	90383	47341	211233	110640	233708	40
21	42815	90371	47377	211075	110655	233565	39
22	42841	90358	47412	210916	110670	233421	38
23	42867	90346	47448	210758	110686	233278	37
24	42894	90334	47484	210599	110701	233135	36
25	42920	90321	47519	210441	110716	232993	35
26	42946	90309	47555	210284	110732	232850	34
27	42972	90296	47591	210126	110747	232708	33
28	42999	90284	47626	209969	110762	232566	32
29	43025	90271	47662	209811	110778	232424	31
30	43051	90259	47698	209654	110793	232282	30

25	Sinuum		Tangentiū		Secantium		
30	43051	90259	47698	209654	110793	232282	30
31	43077	90246	47733	209498	110808	232140	29
32	43104	90233	47769	209341	110824	231999	28
33	43130	90221	47805	209184	110839	231858	27
34	43156	90208	47840	209028	110854	231717	26
35	43182	90196	47876	208872	110870	231576	25
36	43209	90183	47912	208716	110885	231436	24
37	43235	90171	47948	208560	110901	231295	23
38	43261	90158	47984	208405	110916	231155	22
39	43287	90146	48019	208250	110932	231015	21
40	43313	90133	48055	208094	110947	230875	20
41	43340	90120	48091	207939	110963	230735	19
42	43366	90108	48127	207785	110978	230596	18
43	43392	90095	48163	207630	110994	230457	17
44	43418	90082	48198	207476	111009	230317	16
45	43445	90070	48234	207321	111025	230179	15
46	43471	90057	48270	207167	111041	230040	14
47	43497	90045	48306	207014	111056	229901	13
48	43523	90032	48342	206860	111072	229763	12
49	43549	90019	48378	206706	111087	229625	11
50	43575	90007	48414	206553	111103	229487	10
51	43602	89994	48450	206400	111119	229349	9
52	43628	89981	48486	206247	111134	229211	8
53	43654	89968	48521	206094	111150	229074	7
54	43680	89956	48557	205942	111166	228937	6
55	43706	89943	48593	205789	111181	228800	5
56	43733	89930	48629	205637	111197	228663	4
57	43759	89918	48665	205485	111213	228526	3
58	43785	89905	48701	205333	111228	228390	2
59	43811	89892	48737	205182	111244	228253	1
60	43837	89879	48773	205030	111260	228117	0

26	Sinuum		Tangentiū		Secantium		
0	43837	89879	48773	205030	111260	228115	60
1	43863	89867	48809	204879	111276	227981	59
2	43889	89854	48845	204728	111292	227845	58
3	43916	89841	48881	204577	111308	227710	57
4	43942	89828	48917	204426	111323	227574	56
5	43968	89816	48953	204276	111339	227439	55
6	43994	89803	48989	204125	111355	227304	54
7	44020	89790	49026	203975	111371	227169	53
8	44046	89777	49062	203825	111387	227035	52
9	44072	89764	49098	203675	111403	226900	51
10	44098	89752	49134	203526	111419	226766	50
11	44124	89739	49170	203376	111435	226632	49
12	44151	89726	49206	203227	111451	226498	48
13	44177	89713	49242	203078	111467	226364	47
14	44203	89700	49278	202929	111483	226230	46
15	44229	89687	49315	202780	111499	226097	45
16	44255	89674	49351	202631	111515	225963	44
17	44281	89662	49387	202483	111531	225830	43
18	44307	89649	49423	202335	111547	225697	42
19	44333	89636	49459	202187	111563	225564	41
20	44359	89623	49495	202039	111579	225432	40
21	44385	89610	49532	201891	111595	225300	39
22	44411	89597	49568	201743	111611	225167	38
23	44437	89584	49604	201596	111627	225035	37
24	44464	89571	49640	201449	111643	224903	36
25	44490	89558	49677	201302	111659	224772	35
26	44516	89545	49713	201155	111675	224640	34
27	44542	89532	49749	201008	111691	224509	33
28	44568	89519	49786	200862	111708	224378	32
29	44594	89506	49822	200715	111724	224247	31
30	44620	89493	49858	200569	111740	224116	30

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26	Sinuum		Tangentiū		Secantium		
30	44620	89493	49858	200569	111740	224116	30
31	44646	89480	49894	200423	111756	223984	29
32	44672	89467	49931	200277	111772	223855	28
33	44698	89454	49967	200131	111789	223724	27
34	44724	89441	50004	199986	111805	223594	26
35	44750	89428	50040	199841	111821	223464	25
36	44776	89415	50076	199695	111838	223334	24
37	44802	89402	50113	199550	111854	223205	23
38	44828	89389	50149	199406	111870	223075	22
39	44854	89376	50185	199261	111886	222946	21
40	44880	89363	50222	199116	111903	222817	20
41	44906	89350	50258	198972	111919	222688	19
42	44932	89337	50295	198828	111936	222559	18
43	44958	89324	50331	198684	111952	222430	17
44	44984	89311	50368	198540	111968	222302	16
45	45010	89298	50404	198396	111985	222174	15
46	45036	89285	50441	198253	112001	222045	14
47	45062	89272	50477	198110	112018	221918	13
48	45088	89259	50514	197966	112034	221790	12
49	45114	89245	50550	197823	112051	221662	11
50	45140	89232	50587	197680	112067	221535	10
51	45166	89219	50623	197538	112083	221407	9
52	45192	89206	50660	197395	112100	221280	8
53	45218	89193	50696	197253	112117	221153	7
54	45243	89180	50733	197111	112133	221026	6
55	45269	89167	50769	196969	112150	220900	5
56	45295	89153	50800	196827	112166	220773	4
57	45321	89140	50843	196685	112183	220647	3
58	45347	89127	50879	196545	112199	220521	2
59	45373	89114	50916	196402	112216	220395	1
60	45399	89101	50953	196261	112233	220269	0

27	Sinuum		Tangentiū		Secantium		
0	45399	89101	50[illegible]3	196261	112233	220269	60
1	45425	89087	50989	196120	112249	220143	59
2	45451	89074	51026	195979	112266	220018	58
3	45477	89061	51063	195838	112283	219892	57
4	45503	89048	51099	195698	112299	219767	56
5	45529	8907[illegible]	51136	195557	112316	219642	55
6	45554	89021	51173	195417	112333	219517	54
7	45580	89008	51209	195277	112349	219393	53
8	45606	88995	51246	195137	112367	219268	52
9	45632	88981	51283	194997	112383	219144	51
10	45658	88968	51319	194858	112400	219019	50
11	45684	88955	51356	194718	112416	218895	49
12	45710	88942	51393	194579	112433	218771	48
13	45736	88928	51430	194440	112450	218648	47
14	45762	88915	51467	194301	112467	218524	46
15	45787	88902	51503	194162	112484	218401	45
16	45813	88888	51540	194023	112501	218277	44
17	45839	88875	51577	193885	112518	218154	43
18	45865	88862	51614	193746	112534	218031	42
19	45891	88848	51651	193608	112551	217909	41
20	45917	88835	51688	193470	112568	217786	40
21	45943	88822	51724	193332	112585	217663	39
22	45968	88808	51761	193195	112602	217541	38
23	45994	88795	51798	193057	112619	217419	37
24	46020	88782	51835	192920	112636	217297	36
25	46046	88768	51872	192782	112653	217175	35
26	46071	88755	51909	192645	112670	217053	34
27	46097	88741	51946	192508	112687	216932	33
28	46123	88728	51983	192371	112704	216810	32
29	46149	88715	52020	192235	112721	216689	31
30	46175	88701	52057	192098	112738	216568	30

27	Sinuum		Tangentiũ		Secantium		
30	46175	88701	52057	192098	112738	216568	30
31	46201	88688	52094	191962	112755	216447	29
32	46226	88674	52131	191826	112772	216326	28
33	46252	88661	52168	191690	112789	216206	27
34	46278	88647	52205	191554	112807	216085	26
35	46304	88634	52242	191418	112824	215965	25
36	46330	88620	52279	191282	112841	215845	24
37	46355	88607	52316	191147	112858	215725	23
38	46381	88593	52353	191012	112875	215605	22
39	49407	88580	52390	190876	112892	215485	21
40	46433	88566	52427	690741	112910	215366	20
41	46458	88553	52464	190607	112927	215246	19
42	46484	88539	52501	190472	112944	215127	18
43	46510	88526	52538	190337	112961	215008	17
44	46536	88512	52575	190203	112979	214889	16
45	46561	88499	52613	190069	112996	214770	15
46	46587	88485	52650	189935	113013	214651	14
47	46613	88472	52687	189801	113031	214533	13
48	46639	88458	52724	189667	113048	214414	12
49	46664	88445	52761	189533	113065	214296	11
50	46690	88431	52798	189400	113083	214178	10
51	46716	88417	52840	189266	113100	214060	9
52	46742	88404	52873	189133	113117	213942	8
53	46767	88390	52910	189000	113135	213825	7
54	46793	88377	52947	188867	113152	213707	6
55	46819	88363	52985	188734	113170	213590	5
56	46844	88349	53022	188602	113187	213473	4
57	46870	88336	53059	188469	113195	213356	3
58	46896	88322	53096	188337	113222	213239	2
59	46921	88308	53134	188205	113239	213122	1
60	46947	88295	53171	188073	113257	213005	0

28	Sinuum		Tangentiũ		Secantium		
0	46947	88295	53171	188073	113257	213005	60
1	46973	88281	53208	187941	113275	212889	59
2	46999	88267	53246	187809	113292	212773	58
3	47024	88254	53283	187677	113310	212657	57
4	47050	88240	53320	187546	113327	212540	56
5	47076	88226	53358	187415	113345	212425	55
6	47101	88213	53395	187283	113362	212309	54
7	47127	88199	53432	187152	113380	212193	53
8	47152	88185	53470	187021	113398	212078	52
9	47178	88172	53507	186891	113415	211963	51
10	47204	88158	53545	186760	113433	211847	50
11	47229	88144	53582	186630	113451	211732	49
12	47255	88130	53620	186499	113468	211617	48
13	47281	88117	53657	186369	113486	211503	47
14	47306	88103	53694	186239	113504	211388	46
15	47332	88089	53732	186109	113521	211274	45
16	47358	88075	53769	185979	113539	211159	44
17	47383	88062	53807	185850	113557	211045	43
18	47409	88048	53844	185720	113575	210931	42
19	47434	88034	53882	185591	113593	210817	41
20	47460	88020	53920	185462	113610	210704	40
21	47486	88006	53957	185332	113628	210590	39
22	47511	87993	53995	185204	113646	210477	38
23	47537	87979	54032	185075	113664	210363	37
24	47562	87965	54070	184946	113682	210250	36
25	47588	87951	54107	184818	113700	210137	35
26	47614	87937	54145	184689	113718	210024	34
27	47639	87923	54183	184561	113735	209911	33
28	47665	87909	54220	184433	113753	209799	32
29	47690	87896	54258	184305	113771	209686	31
30	47716	87882	54296	184177	113789	209574	30

28	Sinuum		Tangentiū		Secantium		
30	47716	87882	54296	184177	113789	209574	30
31	47741	87868	54333	184049	113807	209462	29
32	47767	87854	54371	183922	113825	209350	28
33	47793	87840	54409	183794	113843	209238	27
34	47818	87826	54446	183667	113861	209126	26
35	47844	87812	54484	183540	113879	209015	25
36	47869	87798	54522	183413	113897	208903	24
37	47895	87784	54560	183286	113916	208791	23
38	47920	87770	54597	183159	113934	208680	22
39	47946	87756	54635	183033	113952	208569	21
40	47971	87743	54673	182906	113970	208458	20
41	47997	87729	54711	182780	113988	208347	19
42	48022	87715	54748	182654	114000	208236	18
43	48048	87701	54786	182528	114024	208126	17
44	48073	87687	54824	182402	114042	208015	16
45	48099	87673	54862	182276	114061	207905	15
46	48124	87659	54900	182150	114079	207795	14
47	48150	87645	54938	182025	114097	207685	13
48	48175	87631	54975	181899	114115	207575	12
49	48201	87617	55013	181774	114134	207465	11
50	48226	87603	55051	181649	114152	207356	10
51	48252	87589	55089	181524	114170	207246	9
52	48277	87575	55127	181399	114188	207137	8
53	48303	87561	55165	181274	114207	207027	7
54	48328	87545	55203	181150	114225	206918	6
55	48354	87532	55241	181025	114243	206809	5
56	48379	87518	55279	180901	114262	206701	4
57	48405	87504	55317	180777	114280	206592	3
58	48430	87490	55355	180653	114299	206483	2
59	48456	87476	55393	180529	114317	206374	1
60	48481	87462	55431	180405	114335	206267	0

29	Sinuum		Tangentiū		Secantium		
0	48481	87462	55431	180405	114335	206267	60
1	48506	87448	55469	180281	114354	206158	59
2	48532	87434	55507	180158	114372	206050	58
3	48557	87420	55545	180034	114391	205942	57
4	48583	87406	55583	179911	114409	205835	56
5	48608	87391	55621	179788	114428	205727	55
6	48634	87377	55659	179665	114446	205619	54
7	48659	87363	55697	179542	114465	205512	53
8	48684	87349	55735	179419	114483	205405	52
9	48710	87335	55774	179296	114502	205298	51
10	48735	87321	55812	179174	114521	205191	50
11	48761	87306	55850	179051	114539	205084	49
12	48786	87292	55888	178929	114558	204977	48
13	48811	87278	55926	178807	114576	204870	47
14	48837	87264	55964	178685	114595	204764	46
15	48862	87250	56003	178563	114614	204658	45
16	48887	87235	56041	178441	114632	204551	44
17	48913	87221	56079	178319	114651	204445	43
18	48938	87207	56117	178198	114679	204339	42
19	48964	87193	56156	178076	114688	204233	41
20	48989	87178	56194	177955	114707	204128	40
21	49014	87164	56232	177834	114726	204022	39
22	49040	87150	56270	177713	114745	203916	38
23	49065	87136	56309	177592	114764	203811	37
24	49090	87121	56347	177471	114782	203706	36
25	49116	87107	56385	177351	114801	203601	35
26	49141	87093	56424	177230	114820	203496	34
27	49166	87079	56462	177110	114839	203391	33
28	49192	87064	56500	176990	114858	203286	32
29	49217	87050	56539	176869	114877	203182	31
30	49242	87036	56577	176749	114896	203077	30

60

29	Sinuum		Tangentiū		Secantium		
30	49242	87036	56577	176749	114896	203077	30
31	49268	87021	56616	176630	114914	202973	29
32	49293	87007	56654	176510	114933	202869	28
33	49318	86993	56693	176330	114952	202765	27
34	49344	86978	56731	176271	114971	202661	26
35	49369	86964	56769	176151	114990	202557	25
36	49394	86949	56808	176032	115009	202453	24
37	49419	86935	56846	175913	115028	202349	23
38	49445	86921	56885	175794	115047	202246	22
39	49470	86906	56923	175675	115067	202143	21
40	49495	86892	56962	175556	115085	202039	20
41	49521	86878	57000	175437	115104	201936	19
42	49546	86863	57039	175319	115124	201833	18
43	49571	86849	57078	175200	115142	201730	17
44	49596	86834	57116	175082	115162	201628	16
45	49622	86820	57155	174964	115181	201525	15
46	49647	86805	57193	174846	115200	201422	14
47	49672	86791	57232	174728	115219	201320	13
48	49697	86777	57271	174610	115238	201218	12
49	49723	86762	57309	174492	115258	201116	11
50	49748	86748	57348	174375	115277	201014	10
51	49773	86733	57386	174257	115296	200912	9
52	49798	86719	57425	174140	115315	200810	8
53	49824	86704	57464	174022	115335	200708	7
54	49849	86690	57503	173905	115354	200607	6
55	49874	86675	57541	173788	115373	200505	5
56	49899	86661	57580	173671	115393	200404	4
57	49924	86646	57619	173555	115412	200303	3
58	49950	86632	57657	173438	115431	200202	2
59	49975	86617	57696	173321	115451	200101	1
60	50000	86603	57735	173205	115470	200000	0

30	Sinuum		Tangentiū		Secantium		
0	50000	86603	57735	173205	115470	200000	60
1	50025	86588	57774	173089	115489	199899	59
2	50050	86573	57813	172973	115509	199799	58
3	50076	86559	57851	172857	115528	199698	57
4	50101	86544	57890	172741	115548	199598	56
5	50126	86530	57929	172625	115567	199498	55
6	50151	86515	57968	172509	115587	199397	54
7	50176	86501	58007	172393	115606	199297	53
8	50201	86486	58046	172278	115626	199198	52
9	50227	86471	58085	172163	115645	199098	51
10	50252	86457	58124	172047	115665	198998	50
11	50277	86442	58162	171932	115684	198899	49
12	50302	86427	58201	171817	115704	198799	48
13	50327	86413	58240	171702	115724	198700	47
14	50352	86398	58279	171588	115743	198601	46
15	50377	86384	58318	171473	115763	198502	45
16	50403	86369	58357	171358	115782	198403	44
17	50428	86354	58397	171244	115802	198304	43
18	50453	86340	58435	171130	115822	198205	42
19	50478	86325	58474	171015	115841	198107	41
20	50503	86310	58513	170901	115861	198008	40
21	50528	86295	58552	170787	115881	197910	39
22	50553	86281	58591	170673	115901	197811	38
23	50578	86266	58631	170560	115920	197713	37
24	50603	86251	58670	170446	115940	197615	36
25	50628	86237	58709	170332	115960	197517	35
26	50654	86222	58748	170219	115980	197420	34
27	50679	86207	58787	170106	116000	197322	33
28	50704	86192	58826	169992	116019	197224	32
29	50729	86178	58865	169879	116039	197127	31
30	50754	86163	58905	169766	116059	197029	30

30	Sinuum		Tangentiū		Secantium		
30	50754	86163	58905	169766	116059	197029	30
31	50779	86148	58944	169653	116079	196932	29
32	50804	86133	58983	169541	116099	196835	28
33	50829	86119	59022	169428	116119	196738	27
34	50854	86104	59061	169315	116139	196641	26
35	50879	86089	59101	169203	116159	196544	25
36	50904	86074	59140	169091	116179	196448	24
37	50929	86059	59179	168979	116199	196351	23
38	50954	86045	59218	168866	116219	196255	22
39	50979	86030	59258	168754	116239	196158	21
40	51004	86015	59297	168643	116259	196062	20
41	51029	86000	59337	168531	116279	195966	19
42	51055	85985	59376	168419	116299	195870	18
43	51079	85970	59415	168308	116319	195774	17
44	51104	85956	59454	168196	116339	195678	16
45	51129	85941	59494	168085	116359	195583	15
46	51154	85926	59533	167974	116380	195487	14
47	51179	85911	59573	167863	116400	195391	13
48	51204	85896	59612	167752	116419	195296	12
49	51229	85881	59651	167641	116440	195201	11
50	51254	85866	59691	167530	116460	195106	10
51	51279	85851	59730	167419	116480	195011	9
52	51304	85836	59770	167309	116501	194916	8
53	51329	85821	59809	167198	116521	194821	7
54	51354	85806	59849	167088	116541	194726	6
55	51379	85792	59888	166978	116562	194632	5
56	51404	85777	59928	166867	116582	194537	4
57	51429	85762	59967	166758	116602	194443	3
58	51454	85747	60007	166647	116623	194349	2
59	51479	85732	60046	166538	116643	194254	1
60	51504	85717	60086	166428	116663	194160	0

31	Sinuum		Tangentiū		Secantium		
0	51504	85717	60086	166428	116663	194160	60
1	51529	85702	60126	166318	116684	194066	59
2	51554	85687	60165	166209	116704	193973	58
3	51579	85672	60205	166099	116725	193879	57
4	51604	85657	60245	165990	116745	193785	56
5	51628	85642	60284	165881	116765	193692	55
6	51653	85627	60324	165772	116786	193598	54
7	51678	85612	60364	165663	116806	193505	53
8	51703	85597	60403	165554	116827	193412	52
9	51728	85582	60443	165445	116848	193319	51
10	51753	85567	60483	165337	116868	193226	50
11	51778	85551	60522	165228	116889	193133	49
12	51803	85536	60562	165120	116909	193040	48
13	51828	85521	60602	165011	116930	192947	47
14	51852	85506	60642	164903	116950	192855	46
15	51877	85491	60681	164795	116971	192762	45
16	51902	85476	60721	164687	116992	192670	44
17	51927	85461	60761	164579	117012	192578	43
18	51952	85446	60801	164471	117033	192486	42
19	51977	85431	60841	164363	117054	192394	41
20	52002	85416	60881	164256	117075	192302	40
21	52026	85401	60921	164148	117095	192210	39
22	52051	85385	60960	164041	117116	192118	38
23	52076	85370	61000	163934	117137	192027	37
24	52101	85355	61040	163826	117158	191935	36
25	52126	85340	61080	163719	117179	191844	35
26	52151	85325	61120	163612	117199	191752	34
27	52175	85310	61160	163505	117220	191661	33
28	52200	85294	61200	163398	117241	191570	32
29	52225	85279	61240	163292	117262	191479	31
30	52250	85264	61280	163185	117283	191388	30

31	Sinuum		Tangentiũ		Secantium		
30	52250	85264	61280	163185	117283	191388	30
31	52275	85249	61320	163075	117304	191297	29
32	52299	85234	61360	162972	117325	191207	28
33	52324	85218	61400	162866	117346	191116	27
34	52349	85203	61440	162760	117367	191025	26
35	52374	85188	61480	162654	117388	190935	25
36	52399	85173	61520	162548	117409	190845	24
37	52423	85157	61561	162442	117430	190755	23
38	52448	85142	61601	162336	117451	190665	22
39	52473	85127	61641	162230	117472	190575	21
40	52498	85112	61681	162125	117493	190485	20
41	52522	85096	61721	162019	117514	190395	19
42	52547	85081	61761	161914	117535	190305	18
43	52572	85066	61801	161809	117556	190215	17
44	52597	85051	61842	161703	117577	190126	16
45	52621	85035	61882	161598	117598	190037	15
46	52646	85020	61922	161493	117620	189948	14
47	52671	85005	61963	161388	117641	189858	13
48	52696	84989	62003	161284	117662	189769	12
49	52720	84974	62043	161179	117683	189680	11
50	52745	84959	62083	161074	117704	189591	10
51	52770	84943	62124	160970	117726	189503	9
52	52794	84928	62164	160865	117747	189414	8
53	52819	84913	62204	160761	117768	189325	7
54	52844	84897	62245	160657	117790	189237	6
55	52869	84882	62285	160553	117811	189148	5
56	52893	84866	62325	160449	117832	189060	4
57	52918	84851	62366	160345	117854	188972	3
58	52943	84836	62406	160241	117875	188884	2
59	52967	84820	62446	160137	117896	188796	1
60	52992	84805	62487	160033	617918	188708	0

32	Sinuum		Tangentiũ		Secantium		
0	52992	84805	62487	160033	117918	188708	60
1	53017	84789	62527	159930	117939	188620	59
2	53041	84773	62570	159827	117961	188533	58
3	53066	84759	62608	159723	117982	188445	57
4	53091	84743	62649	159620	118004	188357	56
5	53115	84728	62689	159517	118025	188270	55
6	53140	84712	62730	159414	118047	188183	54
7	53164	84697	62770	159311	118068	188105	53
8	53189	84681	62811	159208	118090	188008	52
9	53214	84665	62852	159105	118111	187921	51
10	53238	84650	62892	159002	118133	187834	50
11	53263	84635	62933	158900	118155	187748	49
12	53288	84619	62973	158797	118176	187661	48
13	53312	84604	63014	158695	118198	187574	47
14	53337	84588	63055	158593	118220	187488	46
15	53361	84573	63095	158490	118241	187401	45
16	53386	84557	63136	158388	118263	187315	44
17	53411	84542	63177	158286	118285	187229	43
18	53435	84526	63217	158184	118307	187142	42
19	53460	84511	63258	158083	118328	187056	41
20	53484	84495	63299	157981	118350	186970	40
21	53509	84480	63340	157879	118372	186885	39
22	53534	84464	63380	157778	118394	186799	38
23	53558	84448	63421	157676	118416	186713	37
24	53583	84433	63462	157575	118437	186627	36
25	53607	84417	63503	157474	118459	186542	35
26	53632	84402	63543	157372	118481	186457	34
27	53656	84386	63584	157271	118503	186371	33
28	53681	84370	63625	157170	118525	186286	32
29	53705	84355	63666	157069	118547	186201	31
30	53730	84339	63707	156969	118569	186116	30

32	Sinuum		Tangentiũ		Secantium		
30	53730	84335	63707	156961	118569	186116	30
31	53754	84324	63748	156868	118591	186031	29
32	53779	84308	63789	156767	118613	185946	28
33	53804	84292	63830	156667	118635	185861	27
34	53828	84277	63871	156566	118657	185777	26
35	53853	84261	63912	156466	118679	185692	25
36	53877	84245	63953	156366	118701	185608	24
37	53902	84230	63996	156265	118723	185523	23
38	53926	84214	64035	156165	118745	185439	22
39	53951	84198	64076	156065	118767	185355	21
40	53975	84182	64117	155966	118790	185271	20
41	53999	84167	64158	155866	118812	185187	19
42	54024	84151	64199	155766	118834	185103	18
43	54049	84135	64240	155666	118856	185019	17
44	54073	84120	64281	155567	118878	184935	16
45	54097	84104	64322	155467	118901	184852	15
46	54122	84088	64363	155368	118923	184768	14
47	54146	84072	64404	155269	118945	184685	13
48	54171	84057	64446	155170	118967	184601	12
49	54195	84041	64487	155071	118990	184518	11
50	54220	84025	64528	154972	119012	184435	10
51	54244	84009	64569	154873	119034	184352	9
52	54269	83994	64610	154774	119057	184269	8
53	54293	83978	64652	154675	119079	184186	7
54	54317	83962	64693	154576	119102	184103	6
55	54342	83946	64734	154478	119124	184020	5
56	54366	83930	64775	154379	119146	183938	4
57	54391	83915	64817	154281	119169	183855	3
58	54415	83899	64858	154183	119191	183773	2
59	54439	83883	64899	154085	119214	183690	1
60	54464	83867	64941	153987	119236	183608	0

33	Sinuum		Tangentiũ		Secantium		
0	54464	83867	64941	153987	119236	183608	60
1	54488	83851	64982	153888	119259	183526	59
2	54513	83835	65023	153791	119281	183444	58
3	54537	83819	65065	153693	119304	183362	57
4	54561	83804	65106	153595	119327	183280	56
5	54586	83788	65148	153497	119349	183198	55
6	54610	83772	65189	153400	119372	183116	54
7	54635	83756	65231	153302	119394	183034	53
8	54658	83740	65272	153205	119417	182953	52
9	54683	83724	65314	153107	119440	182871	51
10	54708	83708	65355	153010	119463	182790	50
11	54732	83692	65397	152913	119485	132709	49
12	54756	83676	65438	152816	119508	182627	48
13	54781	83661	65480	152719	119531	182546	47
14	54805	83645	65521	152622	119553	182465	46
15	54829	83629	65563	152525	119576	182384	45
16	54854	83613	65604	152429	119599	182303	44
17	54878	83597	65646	152332	119622	182222	43
18	54902	83581	65688	152235	119645	182142	42
19	54927	83565	65729	152139	119668	182061	41
20	54951	83549	65771	152043	119691	181981	40
21	54975	83533	65813	151946	119713	181900	39
22	54999	83517	65854	151850	119736	181820	38
23	55024	83501	65896	151754	119759	181740	37
24	55048	83485	65938	151658	119782	181659	36
25	55072	83469	65980	151562	119805	181579	35
26	55097	83453	66021	151466	119828	181499	34
27	55121	83437	66063	151370	119851	181419	33
28	55145	83421	66105	151275	119874	181340	32
29	55169	83405	66147	151179	119897	181260	31
30	55194	83389	66189	151084	119920	181180	30

33	Sinuum		Tangentiū		Secantium		
30	55194	83389	66189	151084	119920	181180	30
31	55218	83373	66230	150988	119944	181101	29
32	55242	83356	66272	150893	119967	181021	28
33	55266	83340	66314	150797	119990	180942	27
34	55291	83324	66356	150702	120013	180862	26
35	55315	83308	90398	150607	120036	180783	25
36	55339	83292	66440	150512	120059	180704	24
37	55363	83276	66482	150417	120083	180625	23
38	55388	83260	66524	150322	120106	180546	22
39	55412	83244	66566	150228	120129	180467	21
40	55436	83228	66608	150133	120152	180388	20
41	55460	83212	66650	150038	120176	180309	19
42	55484	83195	66692	149944	120199	180231	18
43	55509	83179	66734	149849	120222	180152	17
44	55533	83163	66776	149755	120246	180074	16
45	55557	83147	66818	149661	120269	179995	15
46	55581	83131	66860	149566	120292	179917	14
47	55605	83115	66902	149472	120316	179839	13
48	55630	83098	66944	149378	120339	179761	12
49	55654	83082	66986	149284	120363	179682	11
50	55678	83066	67028	149190	120386	179604	10
51	55702	83050	67071	149097	120410	179527	9
52	55726	83034	67113	149003	120433	179449	8
53	55750	83017	67155	148909	120457	179371	7
54	55775	83001	67197	148816	120480	179293	6
55	55799	82985	67239	148722	120504	179216	5
56	55823	82969	67282	148629	120527	179138	4
57	55847	82953	67324	148536	120551	179061	3
58	55871	82936	67366	148442	120575	178984	2
59	55895	82920	67409	148349	120598	178906	1
60	55919	82904	67451	148256	120622	178829	0

34	Sinuum		Tangentiū		Secantium		
0	55919	82904	67451	148256	120622	178829	60
1	55943	82888	67493	148163	120645	178752	59
2	55968	82871	67536	148070	120669	178675	58
3	55992	82855	67578	147977	120693	178598	57
4	56016	82839	67620	147885	120717	178521	56
5	56040	82822	67663	147792	120740	178445	55
6	56064	82806	67705	147699	120764	178368	54
7	56088	82790	67748	147607	120788	178291	53
8	56112	82773	67790	147514	120812	178215	52
9	56136	82757	67832	147422	120836	178138	51
10	56160	82741	67875	147330	120859	178062	50
11	56184	82724	67917	147238	120883	177986	49
12	56208	82708	67960	147146	120907	177910	48
13	56232	82692	68002	147053	120931	177833	47
14	56256	82675	68045	146962	120955	177757	46
15	56280	82659	68088	146870	120979	177681	45
16	56305	82643	68130	146778	121003	177605	44
17	56329	82626	68173	146686	121027	177530	43
18	56353	82610	68215	146594	121051	177454	42
19	56377	82593	68258	146503	121075	177379	41
20	56401	82577	68301	146411	121099	177303	40
21	56425	82561	68343	146320	121123	177227	39
22	56449	82544	68386	146229	121147	177152	38
23	56473	82528	68429	146137	121171	177077	37
24	56497	82511	68471	146046	121195	177002	36
25	56521	82495	68514	145955	121220	176926	35
26	56545	82478	68557	145864	121244	176851	34
27	56569	82462	68600	145773	121268	176776	33
28	56593	82445	68642	145682	121292	176701	32
29	56617	82429	68685	145592	121316	176627	31
30	56641	82413	68728	145501	121341	176552	30

34	Sinuum		Tangentiū		Secantium		
30	56641	82413	68728	145501	121341	176552	30
31	56665	82396	68771	145410	121365	176477	29
32	56689	82380	68814	145320	121389	176402	28
33	56713	82363	68857	145229	121414	176328	27
34	56736	82347	68900	145139	121438	176253	26
35	56760	82330	68942	145048	121462	176179	25
36	56784	82314	68985	144958	121487	176105	24
37	56808	82297	69028	144868	121510	176031	23
38	56832	82281	69071	144778	121535	175956	22
39	56856	82264	69114	144688	121560	175882	21
40	56880	82248	69157	144598	121584	175808	20
41	56904	82231	69200	144508	121609	175734	19
42	56928	82214	69243	144418	121633	175661	18
43	56952	82198	69286	144329	121658	175587	17
44	56976	82181	69329	144239	121682	175513	16
45	57000	82165	69372	144149	121707	175440	15
46	57024	82148	69416	144060	121731	175366	14
47	57047	82132	69459	143970	121756	175293	13
48	57071	82115	69502	143881	121781	115219	12
49	57095	82098	69545	143792	121805	175146	11
50	57119	82082	69588	143703	121830	175073	10
51	57143	82065	69631	143614	121854	175000	9
52	57167	82048	09675	143524	121879	174926	8
53	57191	82032	69718	143436	121904	174854	7
54	57215	82015	69761	143347	121929	174781	6
55	57238	81999	69804	143358	121953	174708	5
56	57262	81982	69847	143169	121978	174635	4
57	57286	81965	69891	143080	122003	174563	3
58	57310	81949	69934	142992	122028	174490	2
59	57334	81932	69977	142903	122053	174417	1
60	57358	81915	70021	142815	122077	174345	0

35	Sinuum		Tangentiū		Secantium		
0	57358	81915	70021	142815	122077	174345	60
1	57381	81899	70064	142726	122102	174272	59
2	57405	81882	70107	122638	122127	174200	58
3	57429	81865	70151	142550	122152	174128	57
4	57453	81848	70194	142462	122177	174056	56
5	57477	81832	70238	142374	122202	173983	55
6	57501	81815	70281	142286	122227	173911	54
7	57524	81798	70325	142199	122252	173840	53
8	57548	81782	70368	142110	122277	173768	52
9	57572	81765	70412	142022	122302	173696	51
10	57596	81748	70455	141934	122327	173624	50
11	57619	81731	70499	141847	122352	173552	49
12	57643	81714	70542	141759	122377	173481	48
13	57667	81698	70586	141672	122402	173409	47
14	57691	81681	70629	141584	122428	173338	46
15	57715	81664	70673	141497	122453	173267	45
16	57738	81647	70717	141409	122478	173195	44
17	57762	81631	70760	141322	122503	173124	43
18	57786	81614	70804	141235	122528	173053	42
19	57810	81597	70848	141148	122554	172982	41
20	57833	81580	70891	141061	122579	172911	40
21	57857	81563	70935	140974	122604	172840	39
22	57881	81546	70979	140887	122629	172769	38
23	57904	81530	71023	140800	122655	172698	37
24	57928	81513	71066	140714	122680	172628	36
25	57952	81496	71110	140627	122706	172557	35
26	57976	81479	71154	140540	122731	172487	34
27	57999	81462	71198	140454	122756	172416	33
28	58023	81445	71242	140367	122782	172346	32
29	58047	21428	71285	140281	122807	172275	31
30	58070	81412	71329	140195	122833	172205	30

35	Sinuum		Tangentiū		Secantium		
30	58070	81412	71329	140195	122833	177205	30
31	58094	81395	71373	140109	122858	172135	29
32	58118	81378	71417	140022	122884	172065	28
33	58141	81361	71461	139936	122909	171995	27
34	58165	81344	71505	139850	122935	171925	26
35	58189	81327	71549	139764	122961	171855	25
36	58212	81310	71593	139679	122986	171785	24
37	58236	81293	71637	139593	123012	171715	23
38	58260	81276	71681	139507	123037	171646	22
39	58283	81259	71725	139421	123063	171576	21
40	58307	81242	71769	139336	123089	171506	20
41	58330	81225	71813	139250	123114	171437	19
42	58354	81208	71857	139165	123140	171367	18
43	58378	81191	71901	139079	123166	171298	17
44	58401	81174	71946	138994	123192	171229	16
45	58425	81157	71990	138909	123217	171160	15
46	58449	81140	72034	138824	123243	171091	14
47	58472	81123	72078	138738	123269	171021	13
48	58496	81106	72122	138653	123295	170952	12
49	58519	81089	72166	138568	123321	170884	11
50	58543	81072	72211	138484	123347	170815	10
51	58567	81055	72255	138399	123373	170746	9
52	58590	81038	72299	138314	123399	170575	8
53	58614	81021	72344	138229	123424	170609	7
54	58637	81004	72388	138145	123450	170540	6
55	58661	80987	72432	138060	123476	170472	5
56	58684	80970	72477	137976	123502	170403	4
57	58708	80953	72521	137891	123529	170335	3
58	58731	80936	72565	137807	123555	170267	2
59	58755	80919	72610	137722	123581	170198	1
60	58779	80902	72654	137638	123607	170130	0

36	Sinuum		Tangentiũ		Secantium		
0	58779	80902	72654	137638	123607	170130	60
1	58802	80885	72699	137554	123633	170062	59
2	58826	80867	72743	137470	123659	169994	58
3	58849	80850	72788	137386	123685	169926	57
4	58873	80833	72832	137302	123711	169858	56
5	58896	80816	72877	137218	123738	169790	55
6	58920	80799	72921	137134	123764	169723	54
7	58943	80782	72966	137050	123790	169655	53
8	58967	80765	73010	136967	123816	169587	52
9	58990	80748	73055	136883	123843	169520	51
10	59014	80730	73100	136800	123869	169453	50
11	59037	80713	73144	136716	123895	169385	49
12	59061	80696	73189	136633	123922	169318	48
13	59084	80679	73234	136549	123948	169250	47
14	59107	80662	73278	136466	123975	169183	46
15	59131	80644	73323	136383	124001	169116	45
16	59154	80627	73368	136300	124028	169049	44
17	59178	80610	73413	136217	124054	168982	43
18	59201	80593	73457	136133	124081	168915	42
19	59225	80576	73502	136051	124107	168848	41
20	59248	80558	73547	135968	124134	168782	40
21	59272	80541	73592	135885	124160	168715	39
22	59295	80524	73637	135802	124187	168648	38
23	59318	80507	73681	135719	124213	168582	37
24	59342	80489	73726	135637	124240	168515	36
25	59365	80472	73771	135554	124267	168449	35
26	59389	80455	73816	135472	124293	168382	34
27	59412	80438	73861	135389	124320	168316	33
28	59436	80420	73906	135307	124347	168250	32
29	59459	80403	73951	135224	124373	168183	31
30	59482	80386	73996	135142	124400	168117	30

36	Sinuum		Tangentiū		Secantium		
30	59482	80386	73996	135142	124400	168117	30
31	59506	80368	74041	135060	124427	168051	29
32	59529	80351	74086	134978	124454	167985	28
33	59552	80334	74131	134896	124481	167919	27
34	59576	80316	74176	134814	124508	167853	26
35	59599	80299	74221	134732	124534	167788	25
36	59623	80282	74267	134650	124561	167722	24
37	59646	80264	74312	134568	124588	167656	23
38	59669	80247	74357	134487	124615	167591	22
39	59693	80230	74402	134405	124642	167525	21
40	59716	80212	74447	134323	124669	167460	20
41	59739	80195	74492	134242	124696	167394	19
42	59763	80178	74538	134160	124723	167329	18
43	59786	80160	74583	134079	124750	167264	17
44	59809	80143	74628	133998	124777	167199	16
45	59832	80125	74674	133916	124804	167133	15
46	59856	80108	74719	133835	124832	167068	14
47	59879	80091	74764	133754	124859	167003	13
48	59902	80073	74810	133673	124886	166938	12
49	59926	80056	74855	133592	124913	166873	11
50	59949	80038	74900	133511	124940	166809	10
51	59972	80021	74946	133430	124967	166744	9
52	59995	80003	74991	133349	124995	166679	8
53	60019	79986	75037	133268	125022	166615	7
54	60042	79968	75082	133187	125049	166550	6
55	60065	79951	75128	133107	125077	166486	5
56	60089	79934	75173	133026	125104	166421	4
57	60112	79916	75219	132946	125131	166357	3
58	60135	79899	75264	132865	125159	166292	2
59	60159	79881	75310	132785	125186	166228	1
60	60181	79864	75355	132704	125214	166164	0

37	Sinuum		Tangentiū		Secantium			
0	60181	79864	75355	132704	125214	166164	60
1	60205	79846	75401	132624	125241	166100	59
2	60228	79829	75447	132544	125269	166036	58
3	60251	79811	75492	132464	125296	165972	57
4	60274	79793	75538	132384	125324	165908	56
5	60298	79776	75584	132304	125351	165844	55
6	60321	79758	75629	132224	125379	165780	54
7	60344	79741	75675	132144	125406	165716	53
8	60367	79723	75721	132064	125434	165653	52
9	60390	79706	75767	131984	125462	165583	51
10	60414	79688	75812	131904	125489	165526	50
11	60437	79671	75858	131825	125517	165462	49
12	60460	79653	75904	131745	125545	165399	48
13	60483	79635	75950	131666	125572	165335	47
14	60506	79618	75996	131586	125600	165272	46
15	60529	79600	76042	131507	125628	165208	45
16	60553	79583	76088	131427	125656	165146	44
17	60576	79565	76134	131348	125683	165083	43
18	60599	79547	76180	131269	125711	165020	42
19	60622	79530	76226	131190	125739	164957	41
20	60645	79512	76272	131119	125767	164894	40
21	60668	79494	76318	131031	125795	164831	39
22	60691	79477	76364	130952	125823	164768	38
23	60714	79459	76410	130873	125851	164705	37
24	60738	79441	76456	130795	125879	164643	36
25	60761	79424	76502	130716	125907	164580	35
26	60784	79406	76548	130637	125935	164518	34
27	60807	79388	76594	130558	125963	164455	33
28	60830	79371	76640	130480	125991	164393	32
29	60853	79353	76686	130401	126019	164330	31
30	60876	79335	76733	130323	126047	164268	30

37	Sinuum		Tangentiū		Secantium		
30	60876	79335	76733	130323	126047	164268	30
31	60899	79318	76779	130244	126075	164206	29
32	60922	79300	76825	130166	126104	164144	28
33	60945	79282	76871	130087	126132	164082	27
34	60968	79264	76918	130009	126160	164019	26
35	60991	79247	76964	129931	126188	163957	25
36	61015	79229	77010	129853	126216	163895	24
37	61038	79211	77057	129775	126245	163835	23
38	61061	79193	77103	129696	126273	163772	22
39	61084	79176	77149	129618	126301	163710	21
40	61107	79158	77196	129541	126330	163648	20
41	61130	79140	77242	129463	126358	163587	19
42	61153	79122	77289	129385	126387	163525	18
43	61176	79105	77335	129307	126416	163464	17
44	61199	79087	77382	129229	126443	163402	16
45	61222	79069	77428	129152	126472	163341	15
46	61245	79051	77475	129074	126500	163279	14
47	61268	79033	77521	128997	126529	163218	13
48	61291	79015	77568	128919	126557	163157	12
49	61314	78998	77615	128842	126586	163096	11
50	61337	78980	77661	128765	126615	163035	10
51	61360	78962	77708	128687	126643	162974	9
52	61383	78944	77754	128610	126672	162913	8
53	61406	78927	77801	128533	126701	162852	7
54	61429	78908	77848	128456	126729	162791	6
55	61451	78891	77895	128379	126758	162730	5
56	61474	78873	77941	128302	126787	162669	4
57	91497	78855	77988	128225	126815	162609	3
58	61520	78837	78035	128148	126844	162548	2
59	61543	78819	78082	128071	126873	162487	1
60	91566	78801	78129	127994	126902	162427	0

38	Sinuum		Tangentiū		Secantium		
0	61566	78801	78129	127994	126902	162427	60
1	61589	78783	78175	127917	126931	162366	59
2	61612	78765	78222	127841	126960	162306	58
3	61635	78747	78269	127764	126988	162246	57
4	61658	78729	78316	127688	127017	162185	56
5	61681	78711	78363	127611	127046	162125	55
6	61703	78693	78410	127535	127075	162065	54
7	61726	78676	78457	127458	127104	162005	53
8	61749	78658	78504	127382	127133	161945	52
9	61772	78640	78551	127306	127162	161885	51
10	61795	78622	78598	127230	127191	161825	50
11	61818	78604	78645	127153	127221	161765	49
12	61841	78586	78692	127077	127250	161705	48
13	61864	78568	78739	127001	127279	161646	47
14	61887	78550	78786	126925	127308	161586	46
15	61909	78532	78834	126849	127337	161526	45
16	61932	78514	78881	126773	127366	161467	44
17	61955	78496	78928	126698	127396	161407	43
18	61978	78478	78975	126623	127425	161348	42
19	62001	78460	79022	126546	127454	161288	41
20	62024	78442	79070	126471	127483	161229	40
21	62046	78424	79117	126395	127513	161170	39
22	62069	78405	79164	126319	127542	161111	38
23	62092	78387	79212	126244	127572	161051	37
24	62115	78369	79259	126169	127601	160992	36
25	62138	78351	79306	126093	127630	160933	35
26	62160	78333	79354	126018	127660	160875	34
27	62183	78315	79401	125943	127689	160814	33
28	62206	78297	79449	125867	127719	160756	32
29	62229	78279	79496	125792	127748	160698	31
30	62251	78261	79544	125717	127778	160639	30

38	Sinuum		Tangentiū		Secantium		
30	62251	78261	79544	125717	127778	160639	30
31	62274	78243	79591	125642	127807	160580	29
32	62297	78225	79639	125567	127837	160521	28
33	62320	78206	79686	125492	127867	160463	27
34	62342	78188	79734	125417	127896	160404	26
35	62365	78170	79781	125343	127926	160346	25
36	62388	78152	79829	125268	127956	160287	24
37	62411	78134	79877	125193	127985	160229	23
38	62433	78116	79924	125118	128015	160171	22
39	62456	78098	79972	125044	128045	160112	21
40	62479	78079	80020	124969	128075	160054	20
41	62502	78061	80067	124895	128105	159996	19
42	62524	78043	80115	124820	128134	159938	18
43	62547	78025	80163	124746	128164	159880	17
44	62570	78007	80211	124672	128194	159822	16
45	62592	77988	80258	124597	128224	159764	15
46	62615	77970	80306	124523	128254	159706	14
47	62638	77952	80354	124449	128284	159648	13
48	62660	77934	80402	124375	128314	159590	12
49	62683	77916	80450	124301	128344	159533	11
50	62706	77897	80498	124227	128374	159475	10
51	62728	77869	80546	124153	128404	159417	9
52	62751	77861	80594	124080	128434	159360	8
53	62774	77843	80642	124005	128464	159302	7
54	62796	77824	80690	123931	128495	159245	6
55	62819	77806	80738	123858	128525	159188	5
56	62842	77788	80786	123784	128555	159130	4
57	62864	77769	80834	123710	128585	159073	3
58	62887	77751	80882	123637	128615	159016	2
59	62909	77733	80930	123563	128646	158959	1
60	62932	77715	80978	123490	128676	158902	0

39	Sinuum		Tangentiũ		Secantium		
0	62932	77715	80978	123490	128676	158902	60
1	62955	77696	81027	123416	128706	158845	59
2	62977	77678	81075	123343	128737	158788	58
3	63000	77660	81123	123270	128767	158731	57
4	63022	77641	81171	123196	128797	158674	56
5	63045	77623	81220	123123	128828	158617	55
6	63068	77605	81268	123050	128858	158560	54
7	63090	77586	81316	122977	128889	158503	53
8	63113	77568	81365	122904	128919	158447	52
9	63135	77550	81413	122831	128950	158390	51
10	63158	77531	81461	122758	128980	158333	50
11	63180	77513	81510	122685	129011	158277	49
12	63203	77494	81558	122612	129042	158221	48
13	63225	77476	81606	122539	129072	158164	47
14	63248	77458	81655	122467	129103	158108	46
15	63271	77439	81703	122394	129134	158051	45
16	63293	77421	81752	122321	129164	157995	44
17	63316	77402	81800	122249	129195	157939	43
18	63338	77384	81849	122176	129226	157883	42
19	63361	77366	81898	122104	129256	157827	41
20	63383	77347	81946	122031	129287	157771	40
21	63406	77329	81995	121959	129318	157715	39
22	63428	77310	82044	121886	129349	157659	38
23	63451	77292	82092	121814	129380	157603	37
24	63473	77273	82141	121742	129411	157547	36
25	63496	77255	82190	121670	129442	157491	35
26	63518	77236	82238	121598	129473	157436	34
27	63540	77218	82287	121526	129504	157380	33
28	63563	77199	82336	121454	129535	157324	32
29	63585	77181	82385	121382	129566	157269	31
30	63608	77162	82434	121310	129597	157213	30

39	Sinuum		Tangentiũ		Secantium		
30	63608	77162	82434	121310	129597	157213	30
31	63630	77144	82482	121238	129628	157158	29
32	63653	77125	82531	121166	129659	157103	28
33	63675	77107	82580	121094	129690	157047	27
34	63698	77088	83629	121023	129721	156992	26
35	63720	77070	82678	120951	129752	156937	25
36	63742	77051	82727	120879	129784	156881	24
37	63765	77033	82776	120808	129815	156826	23
38	63787	77014	82825	120736	129846	156771	22
39	63810	76996	82874	120665	129877	156716	21
40	63832	76977	82923	120593	129909	156661	20
41	63854	76959	82972	120522	129940	156606	19
42	63877	76940	83022	120451	129972	156551	18
43	63899	76921	83071	120379	130003	156497	17
44	63922	76903	83120	120308	130034	156442	16
45	63944	76884	83169	120237	130066	156387	15
46	63966	76865	83219	120166	130097	156332	14
47	63989	76847	83268	120095	130129	156278	13
48	64011	76828	83317	120024	130160	156223	12
49	64033	76810	88366	119953	130192	156169	11
50	64056	76791	83415	119882	130223	156114	10
51	64078	76772	83465	119811	130255	156060	9
52	64100	76754	83514	119740	130287	156005	8
53	64123	76735	83564	119669	130318	155951	7
54	64145	76717	83613	119599	130350	155897	6
55	64167	76698	83662	119528	130382	155843	5
56	64190	76679	83712	119457	130414	155789	4
57	64212	76661	83761	119387	130445	155734	3
58	64234	76642	83811	119316	130477	155680	2
59	64256	76623	83860	119246	130509	155626	1
60	64279	76604	83910	119175	130541	155572	0

40	Sinuum		Tangentiū		Secantium		
0	64279	76604	83910	119175	130541	155572	60
1	64301	76586	83960	119105	130573	155518	59
2	64323	76567	84009	119035	130605	155465	58
3	64346	76548	84059	118964	130636	155411	57
4	64368	76530	84108	118894	130668	155357	56
5	64390	76511	84158	118824	130700	155303	55
6	64412	76492	84208	118754	130732	155250	54
7	64435	76473	84258	118684	130764	155196	53
8	64457	76455	84307	118614	130797	155143	52
9	64479	76436	84357	118544	130829	155089	51
10	64501	76417	84407	118474	130861	155036	50
11	64524	76398	84457	118404	130893	154982	49
12	64546	76380	84507	118334	130925	154929	48
13	64568	76361	84556	118264	130957	154876	47
14	64590	76342	84606	118194	130989	154822	46
15	64612	76323	84656	118125	131022	154769	45
16	64635	76304	84706	118055	131054	154716	44
17	64657	76286	84756	117986	131086	154663	43
18	64679	76267	84806	117916	131119	154610	42
19	64701	76248	84856	117846	131151	154557	41
20	64723	76229	84906	117777	131183	154504	40
21	64745	76210	84956	117708	131216	154451	39
22	64768	76192	85006	117638	131248	154398	38
23	64790	76173	85057	117569	131281	154345	37
24	64812	76154	85107	117500	131313	154292	36
25	64834	76135	85157	117430	131346	154240	35
26	64856	76116	85207	117361	131378	154187	34
27	64878	76097	85257	117292	131411	154134	33
28	64901	76078	85307	117223	131443	154082	32
29	64923	76059	85358	117154	131475	154029	31
30	64945	76041	85408	117085	131509	153977	30

40	Sinuum		Tangentiū		Secantium		
30	64945	76041	85408	117085	131509	153977	30
31	64967	76022	85458	117016	131541	153924	29
32	64989	76003	85509	116947	131574	153872	28
33	65011	75984	85559	116878	131607	153820	27
34	65033	75965	85609	116809	131640	153768	26
35	65055	75946	85660	116741	131672	153715	25
36	65077	75927	85710	116672	131705	153663	24
37	65099	75908	85761	116603	131738	153611	23
38	65122	75889	85811	116535	131771	153559	22
39	65144	75870	85862	116466	131804	153507	21
40	65166	75851	85912	116398	131837	153455	20
41	65188	75832	85963	116329	131870	153403	19
42	65210	75813	86014	116261	131903	153351	18
43	65232	75794	86064	116192	131936	153299	17
44	65254	75775	86115	116124	131969	153247	16
45	65276	75756	86165	116056	132002	153196	15
46	65298	75738	86216	115987	132035	153144	14
47	65320	75719	86267	115919	132068	153092	13
48	65342	75700	86318	115851	132101	153041	12
49	65364	75680	86368	115783	132134	152989	11
50	65386	75661	86419	115715	132168	152938	10
51	65408	75642	86470	115647	132201	152886	9
52	65430	75623	86521	115579	132234	152835	8
53	65452	75604	86572	115511	132267	152783	7
54	65474	75585	86623	115443	132301	152732	6
55	65496	75566	86674	115375	132334	152680	5
56	65518	75547	86725	115308	132368	152630	4
57	65540	75528	86776	115240	132401	152579	3
58	65562	75509	86827	115172	132434	152527	2
59	65584	75490	86878	115104	132468	152476	1
60	65606	75471	86929	115037	132501	152425	0

41	Sinuum		Tangentium		Secantium		
0	65606	75471	86929	113037	132501	152425	60
1	65628	75452	86980	114969	132535	152374	59
2	65650	75433	87031	114902	132568	152323	58
3	65672	75414	87082	114834	132602	152273	57
4	65694	75395	87133	114767	132636	152222	56
5	65716	75375	87184	114699	132669	152171	55
6	65738	75356	87236	114632	132703	152120	54
7	65759	75337	87287	114565	132737	152069	53
8	65781	75318	87338	114498	132770	152019	52
9	65803	75299	87389	114430	132804	151968	51
10	65825	75280	87441	114363	132838	151918	50
11	65847	75261	87492	114296	132872	151867	49
12	65869	75241	87543	114229	132905	151817	48
13	65891	75222	87595	114162	132939	151766	47
14	65913	75203	87647	114095	132973	151716	46
15	65935	75184	87698	114028	133007	151665	45
16	65956	75165	87749	113961	133041	151615	44
17	65978	75146	87801	113894	133075	151565	43
18	66000	75126	87852	113828	133109	151515	42
19	66022	75107	87904	113761	133143	151465	41
20	66044	75088	87955	113694	133177	151415	40
21	66066	75069	88007	113627	133211	151364	39
22	66088	75050	88059	113561	133245	151314	38
23	66109	75030	88110	113494	133279	151265	37
24	66131	75011	88162	113428	133314	151215	36
25	66153	74992	88214	113361	133348	151165	35
26	66175	74973	88265	113295	133382	151115	34
27	66197	74953	88317	113229	133416	151066	33
28	66218	74934	88369	113162	133451	151016	32
29	66240	74915	88421	113096	133485	150966	31
30	66262	74896	88473	113029	133519	150916	30

41	Sinuum		Tangentiũ		Secantium		
30	66262	74896	88473	113029	133519	150916	30
31	66284	74876	88524	112963	133554	150866	29
32	66306	74857	88576	112897	133588	150817	28
33	66327	74838	88628	112831	133622	150767	27
34	66349	74818	88681	112765	133657	150718	26
35	66371	74799	88732	112699	133691	150669	25
36	66393	74780	88784	112633	133726	150619	24
37	66414	74760	88836	112567	133761	150570	23
38	66436	74741	88888	112501	133795	150521	22
39	66458	74722	88940	112435	133830	150471	21
40	66480	74703	88992	112369	133864	150422	20
41	66501	74683	89045	112303	133899	150373	19
42	66523	74664	89097	112238	133934	150324	18
43	66545	74644	89149	112172	133968	150275	17
44	66566	74625	89201	112106	134003	150226	16
45	66588	74606	89253	112041	134038	150177	15
46	66610	74586	89306	111975	134073	150128	14
47	66632	74567	89358	111909	134108	150079	13
48	66653	74548	89410	111844	134142	150030	12
49	66675	74528	89463	111778	134177	149981	11
50	66697	74509	89515	111713	134212	149933	10
51	66718	74489	89567	111648	134247	149884	9
52	66740	74470	89620	111582	134282	149835	8
53	66762	74451	89672	111517	134317	149787	7
54	66783	74431	89725	111452	134352	149738	6
55	66805	74412	89777	111387	134387	149690	5
56	66827	74392	89830	111321	134423	149641	4
57	66848	74373	89883	111256	134458	149593	3
58	66870	74353	89935	111191	134493	149544	2
59	66891	74334	89988	111126	134528	149496	1
60	66913	74314	90040	111061	134563	149448	0

42	Sinuum		Tangentiū		Secantium		
b	66913	74314	90040	111061	134563	149448	60
1	66935	74295	90093	110996	134599	149399	59
2	66956	74276	90146	110931	134634	149351	58
3	66978	74250	90199	110867	134669	149303	57
4	66999	74237	90251	110802	134704	149255	56
5	67021	74217	90304	110737	134740	149207	55
6	67043	74198	90357	110667	134775	149159	54
7	67064	74178	90410	110607	134811	149111	53
8	67086	74159	90463	110543	134846	149063	52
9	67107	74139	90516	110478	134882	149015	51
10	67129	74120	90568	110414	134917	148967	50
11	67151	74100	90621	110349	134953	148919	49
12	67172	74081	90674	110285	134988	148871	48
13	67194	74061	90727	110220	135024	148824	47
14	67215	74041	90781	110156	135060	148776	46
15	67237	74022	90834	110091	135095	148728	45
16	67258	74002	90887	110027	135131	148681	44
17	67280	73983	90940	109963	135167	148633	43
18	67301	73963	90993	109899	135203	148586	42
19	67323	73944	91046	109834	135238	148538	41
20	67345	73924	91099	109770	135274	148491	40
21	67366	73904	91153	109706	135310	148443	39
22	67387	73885	91206	109642	135346	148396	38
23	67409	73865	91259	109578	135382	148349	37
24	67430	73846	91313	109514	135418	148301	36
25	67452	73826	91366	109450	135454	148254	35
26	67473	73806	91419	109386	135490	148207	34
27	67495	73787	91473	109322	135526	148160	33
28	67516	73767	91526	109258	135562	148113	32
29	67538	73747	91580	109195	135598	148066	31
30	67559	73728	91633	109131	135634	148019	30

42	Sinuum		Tangentiū		Secantium		
30	67552	73728	91633	109131	135634	148019	30
31	67580	73708	91687	109067	135670	147972	29
32	67602	73688	91740	109003	135707	147925	28
33	67623	73669	91794	108940	135743	147878	27
34	67645	73649	91847	108876	135779	147831	26
35	67666	73629	91901	108813	135815	147784	25
36	67688	73610	91955	108749	135852	147738	24
37	67709	73590	92008	108686	135888	147691	23
38	67730	73570	92062	108622	135924	147644	22
39	67752	73551	92116	108559	135961	147598	21
40	67773	73531	92170	108496	135997	147551	20
41	67795	73511	92223	108432	136034	147504	19
42	67816	73491	92277	108369	136070	147458	18
43	67837	73472	92331	108306	136107	147411	17
44	67860	73452	92385	108243	136143	147365	16
45	67880	73432	92439	108179	136180	147319	15
46	67901	73412	92493	108116	136217	147272	14
47	67923	73393	92547	108053	136253	147226	13
48	67944	73373	92601	107990	136290	147180	12
49	67965	73353	92655	107927	136327	147134	11
50	67987	73333	92709	107864	136363	147087	10
51	68008	73314	92763	107801	136400	147041	9
52	68029	73294	92817	107738	136437	146995	8
53	68051	73274	92872	107676	136474	146949	7
54	68072	73254	92926	107613	136511	146903	6
55	68093	73234	92980	107550	136548	146857	5
56	68115	73215	93034	107487	136585	146811	4
57	68136	73195	93088	107425	136622	146765	3
58	68157	73175	93143	107362	136659	146719	2
59	68179	73155	93197	107299	136696	146674	1
60	68200	73135	93252	107237	136733	146628	0

43	Sinuum		Tangentiū		Secantium		
0	68200	73135	93252	107237	136733	146628	60
1	68221	73116	93306	107174	136770	146582	59
2	68242	73096	93360	107112	136807	146537	58
3	68264	73076	93415	107049	136844	146491	57
4	68285	73056	93469	106987	136881	146445	56
5	68306	73036	93524	106925	136919	146400	55
6	68327	73016	93578	106862	136956	146354	54
7	68349	72996	93633	106800	136993	146309	53
8	68370	72976	93688	106738	137030	146263	52
9	68391	72957	93742	106676	137068	146218	51
10	68412	72937	93797	106613	137105	146173	50
11	68433	72917	93852	106551	137143	146127	49
12	68455	72897	93906	106489	137180	146082	48
13	68476	72877	93961	106427	137218	146037	47
14	68497	72857	94016	106365	137255	145992	46
15	68518	72837	94071	106303	137293	145946	45
16	68539	72817	94125	106241	137330	145901	44
17	68561	72797	94181	106179	137368	145856	43
18	68582	72777	94235	106117	137406	145811	42
19	68603	72757	94290	106056	137443	145766	41
20	68624	72737	94345	105993	137481	145721	40
21	68645	72717	94400	105932	137519	145676	39
22	68666	72697	64455	105870	137556	145631	38
23	68688	72677	94510	105809	137594	145587	37
24	68709	72657	94565	105747	137632	145542	36
25	68730	72637	94620	105685	137670	145497	35
26	68751	72617	94676	105624	137708	145452	34
27	68772	72597	94731	105562	137746	145408	33
28	68793	72577	94786	105501	137782	145363	32
29	68814	72557	94841	105439	137822	145319	31
30	68835	72537	94896	105378	137860	145274	30

43	Sinuum		Tangentiū		Secantium		
30	68835	72537	94896	105378	137860	145274	30
31	68857	72517	94952	105317	137898	145220	29
32	68878	72497	95007	105255	137936	145185	28
33	68899	72477	95062	105194	137974	145141	27
34	68920	72457	95118	105133	138012	145096	26
35	68941	72437	95173	105072	138051	145052	25
36	68962	72417	95229	105010	138089	145007	24
37	68983	72397	95284	104949	138127	144963	23
38	69004	72377	95340	104888	138165	144919	22
39	69025	72357	95395	104827	138204	144875	21
40	69046	72337	95451	104766	138242	144831	20
41	69067	72317	95506	104704	138280	144786	19
42	69088	72297	95562	104644	138319	144742	18
43	69109	72277	95618	104583	138357	144698	17
44	69130	72257	95673	104522	138396	144654	16
45	69151	72236	95729	104461	138434	144610	15
46	69172	72216	95785	104401	138473	144566	14
47	69193	72196	95841	104340	138512	144523	13
48	69214	72176	95897	104279	138550	144479	12
49	69235	72156	95952	104218	138589	144435	11
50	69256	72136	96008	104158	138628	144391	10
51	69277	72116	96064	104097	138666	144347	9
52	69298	72095	96120	104036	138705	144304	8
53	69319	72075	96176	103976	138744	144260	7
54	69340	72055	96232	103915	138783	144216	6
55	69361	72035	96288	103855	138822	144173	5
56	69382	72015	96344	153794	138860	144129	4
57	69403	71995	96400	103734	138899	144086	3
58	69424	71974	96457	103674	138938	144042	2
59	69445	71954	96513	103613	138977	143999	1
60	69466	71934	96569	103553	139016	143956	0

44	Sinuum		Tangentiū		Secantium		
0	69466	71934	96569	103553	139016	143956	60
1	69487	71914	96625	103493	139055	143912	59
2	69508	71894	96681	103433	139095	143869	58
3	69529	71873	96738	103372	139134	143826	57
4	69550	71853	96794	103312	139173	143783	56
5	69570	71833	96850	103252	139212	143739	55
6	69591	71813	96907	103192	139251	143696	54
7	69612	71792	96963	103132	139291	143653	53
8	69633	71772	97020	103072	139330	143610	52
9	69654	71752	97076	103012	139369	143567	51
10	69675	71732	97133	102952	139409	143524	50
11	69696	71711	97189	102892	139448	143481	49
12	69717	71691	97246	102832	139487	143438	48
13	69737	71671	97302	102772	139527	143395	47
14	69758	71650	97359	102713	139566	143352	46
15	69779	71630	97416	102653	139606	143309	45
16	69800	71610	97472	102593	139645	143267	44
17	69821	71590	97529	102533	139685	143224	43
18	69842	71569	97586	102474	139725	143181	42
19	69862	71549	97643	102414	139764	143139	41
20	69883	71529	97700	102355	139804	143096	40
21	69904	71508	97756	102295	139844	143053	39
22	69925	71488	97813	102236	139884	143011	38
23	69946	71468	97870	102176	139924	142968	37
24	69966	71447	97927	102117	139963	142926	36
25	69987	71427	97984	102057	140003	142883	35
26	70008	71407	98041	101998	140043	142841	34
27	70029	71386	98098	101939	140083	142799	33
28	70049	71366	98155	101879	140123	142756	32
29	70070	71345	98213	101820	140163	142714	31
30	70101	71325	98270	101761	140203	142672	30

44	Sinuum		Tangentiū		Secantium		
30	70091	71325	98270	101761	140203	142672	30
31	70112	71305	98327	101702	140243	142630	29
32	70132	71284	98384	101642	140283	142587	28
33	70153	71264	98441	101583	140324	142545	27
34	70174	71244	98499	101524	140364	142503	26
35	70195	71223	98556	101465	140404	142461	25
36	70215	71203	98613	101406	140444	142419	24
37	70236	71182	98671	101347	140485	142377	23
38	70257	71162	98728	101288	140525	142335	22
39	70278	71141	98786	101229	140565	142293	21
40	70298	71121	98843	101170	140606	172251	20
41	70319	71100	98901	101112	140646	142209	19
42	70339	71080	98958	101053	140687	142168	18
43	70360	71059	99016	100994	140727	142126	17
44	70381	71039	99073	100935	140768	142084	16
45	70401	71019	99131	100876	140808	142042	15
46	70422	70998	99189	100818	140849	142001	14
47	70443	70978	99247	100750	140890	141959	13
48	70463	70957	99304	100701	140930	141918	12
49	70484	70937	99362	100642	140971	141876	11
50	70505	70916	99420	100583	141012	141835	10
51	70525	70896	99478	100525	141053	141793	9
52	70546	70875	99536	100467	141093	141752	8
53	70567	70855	99594	100408	141134	141710	7
54	70587	70834	99652	100350	141175	141669	6
55	70608	70813	99710	100291	141216	141628	5
56	70628	70793	99768	100233	141257	141586	4
57	70649	70772	99826	100175	141298	141545	3
58	70670	70752	99884	100116	141339	141504	2
59	70690	70731	99942	100058	141380	141463	1
60	70711	70711	100000	100000	141421	141421	0

Erratorum restitutio in Tabulis.

SINVVM.			TANGEN.			SECANT.		
Gr.	M.	*Emēd.*	Gr.	M.	*Emend.*	Gr.	M.	*Emend.*
1	7	1949	4	3	7080	8	29	101106
6	25	11176	7	5	12426	14	30	103290
7	49	13600	8	45	15391	19	34	106129
7	59	13889	9	3	15928	19	53	106339
8	35	14925	11	14	19861	23	0	108636
13	32	23401	11	15	19891	27	57	113205
						70	30	299
72	10	95195	12	58	23026	70	31	299
73	56	96094	13	15	23547	75	27	398050
74	45	96479	21	53	40166	78	37	102791
80	26	98609	27	51	52836	78	38	102784
81	22	98867				78	56	102658
82	27	99133	60	27	176390	81	32	6-79196
82	55	99248	72	17	313027	88	33	3951855
83	29	99354	75	18	381177	89	29	1108
86	60	99863	82	30	759576			
87	0	99863	82	59	682481			
88	16	99954						
89	39	99998						
89	40	99998						
89	41	99998						